

Information paper

Quality and Methodology Information

General details

Title of output:	UK Manufacturers' Sales by Product Survey
Abbreviated title:	PRODCOM
Designation:	Official Statistics
Geographic coverage:	UK
Date of last SQR or QMI*:	December 2014
Contact details:	prodcompublications@ons.gsi.gov.uk

Executive summary

The [UK Manufacturers' Sales by Product \(PRODCOM\)](#) presents annual statistics on the value and volume of products manufactured in the UK. The reference tables provide estimates of value, volume, and unit values (value per unit of volume) for each product heading, where possible. Other data available by industry include total turnover, merchant goods, work done, sales of waste products and all other income.

Alongside the estimates of PRODCOM sales, trade data or specifically estimates of Intra and Extra EU Imports and Exports are reported up to the June 2013 release. These data are matched with the PRODCOM codes and included within the PRODCOM tables for the benefit of demonstrating the UK trade balance by product. The [PRODCOM Glossary](#) provides more information on these variables, and other PRODCOM concepts. From December 2014, PRODCOM estimates are published without the trade data due to comparability issues listed in the Coherence and comparability section of this report.

The title PRODCOM comes from the French 'PRODUCTION COMMUNAUTAIRE' (Community Production) and, in the UK, was formerly known as the Products of the European Community (PRODCOM) Survey. Prior to 1993, product information was collected through the Annual and Quarterly Sales Inquiries (ASI/QSI).

An extensive revision of the [Nomenclature of Economic Activities \(NACE\)](#) in 2007 led to a revision of the UK [Standard Industrial Classification \(UK SIC\)](#), bringing both of the classifications in line. This resulted in changes to PRODCOM estimates for the 2008 survey onwards. All PRODCOM industry sectors now align exactly to the NACE classification. This differs from previous years where, in some instances, the UK published PRODCOM estimates under its own [Standard Industrial Classification \(SIC UK 2003\)](#) which only matched the NACE classification to the first 4 digits.

The PRODCOM Statistics concern all manufactured products included in the agreed EU [PRODCOM List](#) and the survey sample covers UK businesses active in the Mining and Manufacturing sectors (Standard Industrial Code 2007 (SIC 2007) Sections B and C). Data are collected via a paper questionnaire from a sample of around 21,500 businesses, covering 240 subsectors of the Mining and Manufacturing industry sectors, and around 3,800 products.

The questionnaires are scanned when returned to ONS, and data are edited. A selective editing method was implemented in 2011. This method prioritises the validation of returns which have the largest potential impact on product level estimates. Imputation methods are applied to compensate for non-response, and a non-linear estimation method is used to estimate for non-sampled

* Quality and Methodology Information' (QMI) replaced 'Summary Quality Reports' (SQR) from 04/11

businesses. More details on the editing, imputation and estimation methods are provided in the How the output is created section.

Estimates are published via the web in June (Provisional estimates, 6 months after end of reference year) and December (Intermediate, 12 months after end of reference year; Final estimates, 24 months after end of reference year). Reports are produced at Industry level in Excel and Extensible Markup Language (XML) formats, accompanied by a Statistical Bulletin. A dataset is then made available for approved researchers to access via the ONS [Virtual Microdata Laboratory \(VML\)](#), and [UK Data Service](#).

Further information on the UK Manufacturers' Sales by Product (PRODCOM) is available on the [PRODCOM homepage](#).

This document contains the following sections:

- Output quality
- About the output
- How the output is created
- Validation and quality assurance
- Coherence and comparability
- Concepts and definitions
- Other information, relating to quality trade-offs and user needs
- Sources for further information or advice

Output quality

This document provides a range of information that describes the quality of the output and details any points that should be noted when using the output.

ONS has developed [Guidelines for Measuring Statistical Quality](#); these are based upon the 5 European Statistical System (ESS) quality dimensions. This document addresses these quality dimensions and other important quality characteristics, which are:

- Relevance
- Timeliness and punctuality
- Coherence and comparability
- Accuracy
- Output quality trade-offs
- Assessment of user needs and perceptions
- Accessibility and clarity

More information is provided about these quality dimensions in the sections below.

About the output

Relevance

(The degree to which the statistical outputs meet users' needs.)

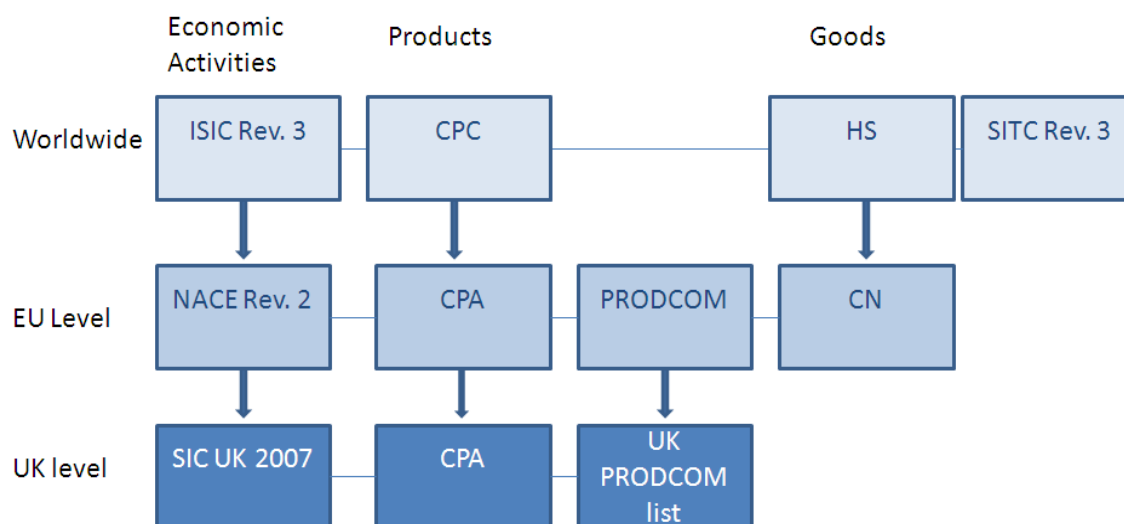
The PRODCOM Survey is governed by [European Union Regulation 3924/91](#) and covers industrial production in the Mining, Quarrying and Manufacturing sectors. The Survey does not cover Recycling or Energy products. The product definitions are standardised across the EU to give comparability between member states' data and the production of EU aggregates at product level.

The [PRODCOM list](#) of products is partially defined by the [NACE](#) classification, and partly defined by the classification of product by activity (CPA). All product heading numbers (referred to as PRODCOM Commodity Codes (PCCs)) used for classification are defined by 1 or more headings of the [Combined Nomenclature \(CN\)](#) which is the EU system for classifying products used to collect trade data through custom's procedures.

To understand how the different nomenclatures fit together, it is useful to consider Figure 1 which gives an overview of the revised system of integrated statistical classifications. This diagram shows the clear links between the PRODCOM list and the CN, which then links up to the [Harmonised System \(HS\)](#) codes at a world-wide level.

The classification system allows the manufactured sales of products to be aligned with trade statistics from [HM Revenue & Customs \(HMRC\)](#). PRODCOM estimates provide businesses and researchers with a powerful tool for market analysis. Users who combine Prodcom estimates with the overseas trade statistics can derive various other statistics, for example: shares of exports, the net supply to the market and unit prices for production, imports and exports; all at the product level. Coherence and inconsistencies with other data sources and statistical outputs are described in the Coherence and comparability section.

Figure 1 - The system of integrated statistical classifications



ISIC = International Standardised Classification of all Economic Activities of the United Nations
 CPC = Central Product Classification of the United Nations
 HS = Harmonised Commodity Description and Coding System of the World Customs Organisation
 SITC = Standard International Trade Classification of the United Nations
 NACE = European Classification of Economic Activities
 CPA = European Classification of Products by Activity
 CN = Combined Nomenclature – European Classification of Goods

PRODCOM outputs are used as part of the National Accounts Supply Table, an integral part of measurement of Gross Domestic Product (GDP). PRODCOM value estimates are required in order to analyse total turnover, work done and industrial services provided for each production industry at the input-output industry and product level. GDP is the primary measure of the overall state of a country's economy; it is extensively reported in the media to track the UK's economic performance.

PRODCOM outputs are also used to create a sampling frame for ONS Producer Prices Index (PPI), as it identifies businesses that make particular products. PPI is used to monitor inflation "at the factory gate".

A number of government departments and other bodies use PRODCOM data to analyse industry trends and inform policy decisions. These include:

- the European Union for making comparisons across the EU, and analysing the competitive performance of individual countries
- the Department for Business, Innovation and Skills for analysing sectors such as healthcare and electronics
- businesses and marketing analysts, as a key input into planning and business decisions; for instance assessing market conditions at the individual product or industry level
- Trade Associations, for information and evidence in advocacy work

Further information on the users of PRODCOM statistics, and the development of a user engagement strategy, can be found in the Assessment of user needs and perceptions section, which is located under the Other information heading.

Aside from the PRODCOM Survey questionnaire, data are collected from the following sources and used in the final published estimates:

- Annual Minerals Raised Inquiry (AMRI): since 1995 the AMRI has collected volume data for minerals extracted
- [International Steel Statistics Bureau \(ISSB\)](#) provides data in respect of iron and steel statistics related to SIC 2007 industries 24.10, 24.32 and 24.33. These are included in the PRODCOM Statistics submitted to Eurostat, but not published as part of ONS release

The uses of these data are primarily to avoid duplication and reduce burden on businesses.

Timeliness and punctuality

(Timeliness refers to the lapse of time between publication and the period to which the data refer. Punctuality refers to the gap between planned and actual publication dates.)

Provisional survey estimates are published 6 months after the end of the reference period; intermediate estimates 12 months after the end of the reference period and a final set of estimates 24 months after the end of the reference period. The long time lag between the collection and publication reflects the complexity of the survey, and the detail of the product level estimates published. The publications are timely and fully compliant with the Eurostat Regulation and timetable.

For more details on related releases, the [UK National Statistics Publication Hub](#) is available online and provides 12 months advance notice of release dates. If there are any changes to the pre-announced release schedule, public attention will be drawn to the change and the reasons for the change will be explained fully at the same time, as set out in the [Code of Practice for Official Statistics](#).

How the output is created

Sample frame	<p>The PRODCOM sample frame is the Inter-Departmental Business Register (IDBR). The IDBR covers businesses in all parts of the economy, except those which are not registered for Value Added Tax (VAT) or Pay as You Earn (PAYE), which includes very small businesses, the self-employed, those without employees, and those with low turnover. Some non-profit making organisations are also not registered on the IDBR. There are 2.1 million businesses on the IDBR, covering nearly 99% of UK economic activity. It is used by government departments, including ONS, as the sampling frame for most business surveys.</p> <p>PRODCOM draws its sample from the 136,600 businesses classified to the Mining and Manufacturing sectors which are in scope for the survey.</p>
Sample design	<p>The current sample design is a stratified random sample, grouped by:</p> <ul style="list-style-type: none"> • employment size-bands: 0-9, 10-19, 20-49, 50-99 and 100+ • industry class: 4-digit SIC UK 2007 classification <p>There are 3 employment size-band cut-off thresholds (of 20, 50 and 100) where all respondents above this point are selected. The cut off level for each industry has been calculated according to the product contribution within each stratum.</p>
Sample size	<p>The PRODCOM Survey samples approximately 21,500 businesses from the Manufacturing Sector, across the UK.</p>

<p>Data collection</p>	<p>Data are collected primarily from businesses through tailored paper questionnaires, to minimise the burden on respondents. An example questionnaire is provided on the PRODCOM Quality and Methods page.</p> <p>Reminders are dispatched for non-response, in addition to a telephone exercise, conducted by a dedicated respondent relations team. Questionnaires are received into the office, scanned and transferred to a data validation system for processing.</p> <p>Newly sampled businesses are telephoned in advance and products are added to their questionnaires prior to dispatch. When these newly selected businesses cannot be contacted in advance, they write in their product description in their first questionnaire. Analysts then “code” product descriptions to appropriate PRODCOM codes.</p>
<p>Variables measured</p>	<p>The key variables for the PRODCOM output are:</p> <ul style="list-style-type: none"> • the value of production • the physical volume of production sold (volume units are dependant on product, for example, number of items, kilograms) • the physical volume of total production manufactured (for some products only) • unit values (sales value per unit volume) are then derived and published <p>In addition to production items, PRODCOM also collects data on some non-production items. These questions allow better comparisons with other sources.</p> <ul style="list-style-type: none"> • Merchant goods - these are manufacturers' sales of goods that have not been subjected to any manufacturing process • Work done - revenue is recorded under "work done" when a manufacturer conducts work on materials that have been supplied to them by a customer • Waste products - these are manufacturers' sales of products and residues that are considered as being waste • All other income - this is revenue derived from the provision of services and other non-production activity not specified elsewhere
<p>Imputation</p>	<p>Automatic imputation using ratio imputation is used when item non-response occurs. Imputation takes place at product level by calculating an average year-on-year growth for all businesses making that product irrespective of size-band or industry classification. The missing value can then be imputed by multiplying the average growth by the previous response. An influential responder, that is, a business that is known to make a significant contribution to product estimates, has its details manually constructed if it does not respond. This construction is based on previously provided product breakdowns, and specialist knowledge of the survey analysts.</p>

Estimation	<p>Estimates are produced using a non-linear estimator. The estimation procedure is based on the employment of the non-sampled units (obtained from the IDBR), along with the Sales Per Head (SPH) (by contributor industry) and product propensity, both of which are obtained from the sampled units, and defined below:</p> <ul style="list-style-type: none"> • SPH = sales value of product /employment count • Product Propensity (PP) = proportion of businesses in strata making the product/number of businesses in the strata. This is the probability that a business within a particular stratum will make the product <p>Businesses with extreme SPHs are removed (see outliers below), and a SPH for the industry is calculated.</p> <p>An estimate of the sales for the non-sampled units, including those that have never responded, is produced by multiplying the PP by the employment of the non-sampled businesses, which is then multiplied by the SPH for the industry.</p> <p>The total UK manufacturer sales for the product is calculated by summing the total returned sales of the sampled units (including imputed and constructed values) and the estimated sales of businesses that have never returned their questionnaire/were not in the sample (non-sampled units).</p>
Outliers	<p>Outlier trimming, the removal of atypical responses, occurs based on SPH on the top and bottom 5% of SPH where there are 10 or more observations in a stratum.</p>
Disclosure	<p>PRODCOM is conducted under the Statistics of Trade Act 1947. This Act imposes restrictions on the way that data collected during the survey may be used. This ensures that information attributable to an individual organisation is not disclosed in any publication. The Code of Practice for Official Statistics, and specifically Principle 5: Confidentiality - set out practices for how we protect data from being disclosed. The Principle includes a guarantee to survey respondents to “ensure that official statistics do not reveal the identity of an individual or organisation, or any private information relating to them”. More information can be found on the ONS Statistical Disclosure Control Methodology page.</p> <p>Disclosure is a particularly sensitive issue in business surveys, given the commercial confidentiality of the data collected. In general, the following rules are applied to the PRODCOM estimates, the exception being if the respondent is willing to allow the data to be published.</p> <ul style="list-style-type: none"> • Minimum threshold rule - this rule states that there must be at least n reporting units (businesses) in a cell • $P\%$ rule - the total contribution of the m largest contributors to the cell aggregated total must be less than $p\%$ of the total in that cell. Sometimes this rule can be applied multiple times, with different values of m and p • Dominance rule - the estimated total of all the units in the cell (including those not included in the sample) without the d largest units from the sample must be at least $s\%$ of the largest b unit values in the sample

Validation and quality assurance

Accuracy

(The degree of closeness between an estimate and the true value.)

The total error in a survey estimate is the difference between the estimate derived from the data collected and the true (unknown) value for the population. The total error consists of 2 main elements; the sampling error and the non-sampling error.

Sampling error - the sampling error is the error that arises because the estimate is based on a survey rather than a census of the population. The results obtained for any single sample may, by

chance, vary from the true values for the population but the variation would be expected to be zero on average over a number of repeats of the survey.

- The standard error is the estimated value of the average magnitude of the sampling error. Our estimate for a variable, plus and minus the standard error for the variable, gives the range in which the true unknown value for the population should lie
- The coefficient of variation (CV) is estimated by the standard error of a variable divided by the survey estimate, and it is used to compare the relative precision across surveys or variables. The closer the coefficient of variation is to zero, the less uncertainty there is in the estimate

Estimated standard errors and CVs are available for the product level estimates published in the PRODCOM output. These should be taken into account when using the PRODCOM estimates. To minimise the burden on businesses, and to complete the survey in the allocated resources, the sample size is limited. This means that sometimes there is uncertainty around detailed product estimates, resulting in large CVs.

Non-sampling error - non-sampling errors are not easy to quantify but can be caused by errors in coverage, measurement, processing and non-response. The response rate gives an indication of the likely impact of non-response error on the survey estimates; non-response rates are published in the PRODCOM Statistical Bulletin.

- Response accuracy - it is difficult to accurately quantify the effect of response inaccuracy. Questionnaires are tailored to individual businesses where possible, so that they are only asked to return sales values and volumes of products that we know they produce, or have produced in the past. This helps to reduce inaccuracy in the product coding
- Industry classification in the IDBR - industry re-classification of a business can occur due to a relatively small change to the nature of its operation, and this can have a significant effect on PRODCOM estimates. Where a survey does not cover the whole business population, such as PRODCOM, re-classification can lead to units moving in and out of scope of the sample, despite the business still manufacturing as a secondary activity. We minimise this error by ensuring that key respondents to products remain in the sample where possible

In addition, the correction of mis-classified businesses can lead to bias, particularly where there is systematic movement from one industry to another. This is because, where classification updates are identified via survey returns, it is only units in the survey sample which are updated.

- Coverage errors - the coverage of the PRODCOM survey is impossible to assess because it is not possible to identify all enterprises which manufacture goods included in the PRODCOM List. Consequently, since the IDBR does not offer information on products but only on economic activities, the coverage of the PRODCOM survey is generally assessed by using the enterprises' turnover or employment as a reference. This method ensures a general assessment of coverage and it has to be viewed with caution.

Editing, Imputation and Estimation methods are used to reduce the impact of measurement, non-response errors, see the How the output is created section for more information.

Reliability - assessing the difference between the first published estimate and the final revised figure provides an indication of reliability. PRODCOM revises data for up to 2 previous years by taking on late responses, or where a business revises its own return. More information on PRODCOM revisions is published in the Statistical Bulletin of the Intermediate and Final estimates.

Coherence and comparability

(Coherence is the degree to which data that are derived from different sources or methods, but refer to the same topic, are similar. Comparability is the degree to which data can be compared over time and domain for example, geographic level.)

PRODCOM is designed in accordance with Eurostat regulations ([EU Regulation 3924/91](#)) to ensure comparability across European Union Member States. A key aspect of this is the use of UK SIC, which is consistent with the European Union's NACE system of industry classification.

Coherence with external trade statistics

Matching PRODCOM estimates and International Trade statistics, helps to provide a more complete picture of domestic sales, consumption of goods and the UK trade balance. However, there are several differences between PRODCOM and International Trade statistics data sources.

- Coverage - export values may include products not produced in the UK. A product may cross borders more than once in the reporting period
- Volume units - a comparison of trade and PRODCOM data is not possible if 2 different volumes units are used. This is the case for several PRODCOM products. These known differences in volume units are highlighted on the front page of the reference excel tables (for 2012 Intermediate Estimates onwards)
- Valuation - PRODCOM products are valued at the price at which they are sold by the manufacturer. The trade statistics uses the values of the good when they are exported, which may include transport costs, and profit by intermediaries, for example. There may also be differences in the time of recording the transaction

Intra and extra EU imports and exports data, together with the trade balance and the UK net supply data were previously published alongside estimates of PRODCOM sales for users who may want to match both sets of data. However, as a result of the comparability issues listed above, PRODCOM sales are now published alone. Following a discussion with users and starting from the 2013 Intermediate and 2012 final estimates, those who require the trade estimates to match it with Prodcum estimates may obtain it directly from [HMRC](#). Users are however advised to consider the comparability issues when drawing comparisons. A review of the trade data will be undertaken with the view to reintroduce it if it is possible to improve comparability. Update of progress will be published on our [website](#).

Coherence with the Annual Business Survey (ABS)

The [ABS](#) also collects total turnover plus other variables similar to the standard headings collected by PRODCOM. However, PRODCOM focuses on products, and ABS focuses on activities. The total value of production for business in an industry group may be different to the turnover reported by ABS for the same industry group. Enterprises may carry out other activities besides production that contribute to its turnover.

Coherence with the Index of Production (IOP)

The [IOP](#) collects total production turnover but not data about individual products manufactured. However, some differences in the sources can compromise the coherence between the outputs at industry level. The "volume" measurement for IOP is a chained volume index opposed to the "volumes" collected by PRODCOM which equate primarily to units measured, for example, litres, tonnes, number of items. PRODCOM estimates the value of production sold during the reference period - this may not be the same as Total production, which is estimated by IOP.

Comparable time series are available going back to the year 2008. Results for PRODCOM are available on the UK SIC 2003 system for the reference years 1993-2007. However, following the 2007 review, UK SIC 2003 was updated to UK SIC 2007, to reflect changes to the structure of the European economy, for example, the growth in technology industries. As a result, PRODCOM estimates from reference year 2008 onwards are published classified by UK SIC 2007, and these are not directly comparable with the earlier results published on UK SIC 2003. [Eurostat](#) have published product level PRODCOM estimates under both the UK SIC 2003 (NACE Rev 1.1) and UK SIC 2007 (NACE Rev 2) from 1995 onwards.

Concepts and definitions

(Concepts and definitions describe the legislation governing the output, and a description of the classifications used in the output.)

The PRODCOM Survey is governed by [European Union Regulation 3924/91](#) and covers Mining, Quarrying and Manufacturing. Each member state reports the production sales values and volumes for all products on the [PRODCOM List](#). This list is reviewed and updated each year.

More information on the PRODCOM List and its relationship with other standard classifications can be found in the About the output section. An example of the hierarchy of the published data can be seen below:

- Division: 10 - Manufacture of food products
 - Industry code: 10.83 - Processing of tea and coffee
 - Product aggregate code: 10.83.11 - Coffee, decaffeinated or roasted
 - Product code: 10.83.11.30 - Decaffeinated coffee, not roasted
 - Product code: 10.83.11.50 - Roasted coffee not decaffeinated
 - Product code: 10.83.11.70 - Roasted decaffeinated coffee

Other information

Output quality trade-offs

(Trade-offs are the extent to which different dimensions of quality are balanced against each other.)

In order to comply with the EU Regulation and to provide more timely data, provisional survey estimates are published on or around the 30 June each year, 6 months after the reference period. At this time, the survey response rate, by number of questionnaires returned and validated, is approximately 60%. In order to provide more accurate estimates, data are revised and published as detailed in the Timeliness and punctuality section above.

Assessment of user needs and perceptions

(The processes for finding out about uses and users, and their views on the statistical products.)

A summary of our key users is given in the About the output section.

The PRODCOM team also welcomes feedback from users through the [Business and Trade Statistics Community](#) on the Royal Statistical Society's StatsUserNet. This is a forum to promote dialogue, share information and maintain close liaison between the producers and users of official business and trade statistics. Feedback, comments and requests are also sought from users that contact us through the prodcompublishments@ons.gsi.gov.uk email address.

A user satisfaction survey was carried out in 2013, and a summary of user feedback has been published on the [PRODCOM User Engagement and Survey Management](#) web page.

Sources for further information or advice

Accessibility and clarity

(Accessibility is the ease with which users are able to access the data, also reflecting the format in which the data are available and the availability of supporting information. Clarity refers to the quality and sufficiency of the release details, illustrations and accompanying advice.)

ONS' recommended format for accessible content is a combination of HTML web pages for narrative, charts and graphs, with data being provided in usable formats such as CSV, XML and Excel. The ONS website also offers users the option to download the narrative in PDF format. In some instances other software may be used, or may be available on request. Available formats for content published on the ONS website but not produced by the ONS, or referenced on the ONS website but stored elsewhere, may vary. For further information please refer to the contact details at the beginning of this document.

For information regarding conditions of access to data, please refer to the links below.

- [Terms and conditions \(for data on the website\)](#)
- [Copyright and reuse of published data](#)
- [Pre-release access \(including conditions of access\)](#)
- [Access to microdata via the Virtual Microdata Laboratory](#)
- [Accessibility](#)

The PRODCOM reference tables provide a detailed breakdown of UK manufacturers' sales by product, for reference years 2008 to the present. A data interpretation guide is available to aid the interpretation of estimates provided within the reference tables. Up to the June 2013 release, estimates of Intra and Extra EU Imports and Exports are also reported, alongside the estimates of PRODCOM sales. These data are collected by [HMRC](#), and are matched with the PRODCOM codes for the benefit of demonstrating the UK trade balance. From December 2014, Prodcom estimates

are published without the trade data. Users who require the trade data may obtain them directly from HMRC.

In addition to this Quality and Methodology Information, Basic Quality Information relevant to each release is available in the background notes of the relevant [Statistical Bulletin](#).

The [UK Manufacturers' Sales by Product \(PRODCOM\) webpage](#) provides further details on the PRODCOM Survey, including: History and Background; News; link to Publications; Quality and Methods; and User Engagement and Survey Governance.

PRODCOM releases include background notes to aid user understanding of published estimates, a [user guide](#) to aid the interpretation of estimates and a [technical report](#) containing detailed methodological information on all aspects of the survey.

Further enquiries about PRODCOM can be addressed to the team at prodcompublishments@ons.gsi.gov.uk.