

PRICE ASSESSMENT METHODOLOGY AND SPECIFICATIONS

Packaging Paper and Board – Europe

Last updated: October 2017

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KEY CONCEPTS

Each price assessment is...

RISI's assessment of the **open market reference price** for **recurring business** based on **actual transaction prices** and supporting data gathered from a **systematic survey of buyers and sellers** that has been **rigorously evaluated**.

Open market prices are those arrived at through negotiation, so exclude:

- Transfers between an integrated producer and its own converting plants
- "Indexed" transactions, i.e. transactions whose price is determined by a formula based on published prices (whether from RISI or other source)

(See "Grade detail and specifications" below)

Recurring business: Reflects transactions in ongoing supply relationships and excludes one-off/spot transactions. *(See "Grade detail and specifications" below)*

Actual transaction prices form the bulk of data in each assessment; supporting data like price offers made or received is used to support transaction data. *(See "Types of data considered" below)*

A **reference price** assessment represents the price negotiated each month that may serve as a basis from which customer-specific discounts are given based on the customer's volume or long-term relationship with a supplier. *(See "Grade detail and specifications" below)*

Systematic survey of buyers and sellers: Survey has thorough representation of the market and includes both buyers and sellers, and a range of players from small to large. *(See "Data collection process" below)*

Rigorous evaluation: Assessment procedures include evaluation, verification, weighting and aggregation, plus confirmation of the assessment by a supervising editor. *(See "How prices are assessed" below)*

About this methodology

RISI Indices is the division of RISI responsible for price assessments. This document describes the procedures RISI Indices uses to determine its European containerboard, cartonboard and sack kraft paper price assessments. As of mid-2015, this methodology has been strengthened by application of the Principles for Oil Price Reporting Agencies published by IOSCO, the International Organization of Securities Commissions (www.iosco.org).

RISI has *voluntarily* chosen to adapt these principles to the markets we cover even though our markets fall outside of the governance of IOSCO and the Principles. That's because these guidelines represent the internationally recognized gold standard in price assessment. By adapting and implementing these principles, RISI demonstrates its commitment to providing the highest degree of reliability in price reporting.

For more on the Principles and how RISI has applied them, see "Implementation of IOSCO's Principles for Oil Price Reporting Agencies" at www.risi.com/iosco.

HOW PRICES ARE ASSESSED

RISI indices creates price assessments in accordance with this methodology document and our internal Price Assessment Procedures Manual.

Who assesses prices

Prices are assessed by a European team of packaging paper/board editors. Standards for training, experience and skills required for editors involved in price assessment, as well as supervision of editors, are described in the RISI Indices Price Assessment Procedures Manual.

Data collection process

RISI Indices makes price assessments based on a systematic survey of active market participants to find out agreed transaction prices and volumes as well as price offers made or received, and other supporting information such as supply and demand conditions.

The amount and type of information that a respondent provides each month varies across individuals and companies; data from respondents providing more complete information is weighted more heavily in the final assessment. Price data are also weighted roughly according to tonnage.

Data providers

The survey includes both buyers and sellers, ensuring that the survey pool is balanced and representative of the overall market. See "Grade Detail and Specifications" section below for details for each grade.

All market participants are encouraged to submit price data and supporting market information for inclusion in the assessment.

How data are provided

Each price period, the price assessor contacts data providers and collects data via phone interviews and emails.

Types of data considered

Directly considered data

The following types of data may be included in an assessment. Each successive type of data is only considered if the volume of previous types is deemed insufficient to yield a reliable and representative market price assessment. See "Grade Detail and Specifications" below for details on the relative importance of data types used in each specific price assessment.

1. **Transaction prices**
 - a. Price levels
 - b. Change of price levels from previous period

2. **Price offers** made or received. A single offer price in itself cannot be considered a market price because it represents only one party's desire to trade. The midpoint between a seller's offer to sell and buyer's comparable offer to buy is considered the market price level.
3. **Trigger prices:** In absence of actual transactions or price offers, the price at which a seller would sell or a buyer would buy based on their assessment of the market.
4. **Participants' estimates of market levels**
5. **Prices for comparable grades or basis weights** that can substitute for the grade in question and that have relatively consistent historical spreads against the grade in question.

Influencing data

These types of data aren't price points that enter directly into an assessment. Rather, these data can serve to either corroborate or cast doubt on directly considered data points, thus leading the assessor to increase or reduce the weight attached to that data point.

For instance, given that higher inventories tend to be associated with downward pressure on prices, knowledge that inventory levels at mills are substantially above normal would cause us to assign a relatively lower weight to transaction data that show an increase in prices vs. the last period and that aren't supported by other criteria.

1. **Prices in other geographical markets** for the grade in question can be used as influencing data if those markets have a direct impact on the market in question, for instance if producers can decide to offer tonnage in one market or the other.
2. **Other market data**, including inventory data and exchange rates.

Transaction prices are the most important data source for all assessments. See "Grade Detail and Specifications" below for details on the relative importance of data types used in each specific price assessment.

Assessment calculation

Criteria for exclusion of data

Data are excluded from the assessment in the following cases:

- The price of a transaction is indexed to published prices from RISI or another source.
A transaction price is considered "indexed" when it is entirely determined according to a formula based on a published price assessment, whether that assessment is from RISI or any other source.
- The transactions don't meet the assessment specifications. (See "Grade Detail and Specifications" section below.)
- The transaction has special circumstances that, in the price assessor's judgment, render it unrepresentative of the broader market and/or not repeatable. (This type of exclusion is rarely used.)

Normalization of data

Normalization is the process of adjusting data so that it can be properly compared to other data. Basis weight upcharges may be adjusted so, for example, a price for 125 g unbleached kraftliner can be compared with 150 g and 175 g unbleached kraftliner prices.

Since domestic prices are reported on a delivered basis, transactions subject to unusually high or low freight are normalized to eliminate the effect of these freight extremes.

Weighting of data

- Higher-quality data are weighted more heavily than lower-quality data.
Higher-quality data includes:
 - Data with more detail, e.g. prices reported as separate transactions with accompanying volume rather than an overall average price.
 - Data whose credibility is supported by answers to the assessor's follow-up questions.
 - Data from contacts with a history of reliability. Contacts are deemed more reliable if they:
 - Provide information that is corroborated by other sources
 - Provide complete and detailed information
 - Provide information regularly and consistently over time
 - Report price information that goes against their natural interests (e.g. a buyer reporting higher prices or a producer reporting lower prices)
- Data are weighted according to the type of information (see "Relative importance of data types" under "Grade Detail and Specifications" below).

- Larger transactions are given more weight than smaller ones. However, the weighting of any single data provider's data is limited so that it doesn't dominate the assessment. For Category 1 prices (e.g. Testliner 2, 140g,

Germany), this cap is more formal: no single data provider's data will be weighted so that it contributes more than 25% of the final assessment.

CONTROLS AND COMPLIANCE

Ensuring consistency and quality of assessments

RISI Indices has in place a number of procedures to ensure the consistency and quality of price assessments, including:

- **Sign-off:** Prior to publication, each price assessment is reviewed by a senior price assessor other than the assessor primarily responsible for the assessment to ensure the assessment is accurate and has followed proper procedures.
- **Quality assurance audit:** A supervising editor is responsible for overseeing all price assessments. The supervisor will periodically do a detailed review of decision-making for a given price assessment, reviewing price assessments in relation to assessments from similar markets, ensuring that the methodology has been followed consistently and that judgment has been applied appropriately.
- **Market review:** On a regular basis (i.e. annually for the main containerboard grades), Indices staff reviews markets and methodologies to ensure that assessment methodologies and the assessments they produce are appropriate for the market.
- **External audit:** In accordance with the standards of IOSCO's PRA Principles, Category 1 price assessments (benchmark grades, e.g. Testliner 2, 140g, Germany – see specifications below) are audited to ensure that assessments comply with this methodology and with IOSCO's PRA Principles.

Following its acquisition by Euromoney plc in 2017, RISI is currently in the process of implementing a new policy and compliance regime. Some of the commitments made to adapt IOSCO's Principles for Oil Price Reporting Agencies have therefore been paused temporarily. These include annual internal quality assurance reviews and external audits. This by no means indicates a relaxation in standards. RISI remains committed to providing the highest quality of price reporting through robust methodologies and strong internal processes.

Independence and freedom from conflicts of interest

Please see RISI Indices' Conflicts of Interest Policy (www.risi.com/conflicts). Key points include:

Independence of RISI

RISI has no affiliation with buyers or sellers of forest products and therefore no vested interest in either higher or lower prices.

Absence of financial interest

RISI is free of ownership or other ties that would give it a financial interest in the movement of prices we report. RISI prohibits its employees who conduct price assessments from having a financial interest (excluding passive investments like mutual funds) in companies whose values are directly and substantially affected by prices on which they report.

Separation from forecasting

RISI Indices is a separate business unit from RISI Analytics, which carries out RISI's forecasting activities, ensuring that forecasting of future prices doesn't influence assessment of actual prices.

Confidentiality

Our data providers are essential to our work, so RISI Indices goes to great lengths to keep price survey data confidential. Confidential data include both the data collected and the names of individuals and companies who provide data. RISI's policy is to neither confirm nor deny the participation of any individual or company in our price surveys at any time, either directly or indirectly.

This confidentiality is essential to ensure the highest number of data contributors as well to ensure that contributing data to RISI cannot be used as a means for market players to unfairly communicate to each other.

RISI Indices' Confidentiality and Data Protection policy (www.risi.com/confidentiality) explains full details around how price assessors protect the confidentiality of their contacts and data. Each year, price assessors are trained in data protection procedures and must sign a compliance agreement.

Antitrust compliance

All price assessment methodologies from RISI Indices are explicitly designed to comply with antitrust rules. See RISI Indices' Antitrust Compliance Policy (www.risi.com/antitrust) for further details.

Disclaimer of warranty

Although RISI collects information from sources who are believed to be reliable, RISI does not warrant or guarantee the accuracy or completeness of its price assessments. Actual transaction prices will often vary from the assessed level. Under no circumstances shall RISI nor any of its subsidiaries, parent corporations and affiliates, and all of their respective officers, directors, owners, employees, agents, licensors, representatives, licensors and suppliers (collectively, the "RISI Parties"), be liable for any loss or damage caused by your reliance on information obtained through the RISI services. It is your responsibility to evaluate the information, opinion, advice, or other content available through the RISI services.

Changes to methodology and specifications

RISI Indices periodically reviews the markets it covers to ensure that our methodology and specifications are still appropriate for that market.

Understanding that some RISI Indices price assessments are used in long-term contracts, RISI Indices seeks to minimize changes that will affect the continuity of its price assessment over time.

Prior to implementing any material changes to the methodology and specifications, these changes will be announced in draft form and open for comment from all stakeholders. RISI Indices will review all comments and seek to balance the views of all players as much as possible while ensuring the reliability of price assessments.

Based on comments received, RISI Indices will finalize the changes and announce them to the market, specifying exactly what will change and when.

Feedback and complaints

RISI Indices welcomes feedback on its price assessment methodology as well as on specific price assessments published. We greatly value such feedback and the dialog that it generates.

In general, such feedback is most effectively dealt with by the editor directly in charge of the price assessment in question. We invite you to speak with or email any of your existing contacts within the editorial team, or view a list of contacts at www.risi.com/EditorialContacts.

If working with the editor does not adequately address your issue, please view our procedures for submitting complaints at www.risi.com/complaints.

GRADE DETAIL AND SPECIFICATIONS

General specifications

These are specifications that apply to all packaging paper/board grades. Specifications unique to each grade are detailed below.

Where published	<p>PPI Europe</p> <ul style="list-style-type: none"> • Newsletter (pdf) • Online (interactive database)
Frequency	<p>Monthly (Germany, UK, France, Italy)</p> <p>Quarterly (Spain, Russia, sack kraft)</p>
Schedule	See www.risi.com/schedule
Assessment window	<p>Each price represents the price agreed for shipments in the period from the previously published assessment to the latest assessment.</p> <p>Note that this means that a “January” price assessment doesn’t reflect prices from January 1 to January 31, for instance. German prices are published the second issue of each month, for instance. So, German prices published in January would represent prices from the second week in December through the second week in January.</p> <p>Assessments reflect prices agreed as of the date the assessment is published and don’t reflect any agreements on price that take effect on future shipments.</p>
Transaction types reflected	<p>Open market transactions in ongoing supply relationships (i.e. excluding spot transactions)</p> <p>Open market transactions are defined as those whose price is arrived at through negotiation. This excludes:</p> <ul style="list-style-type: none"> • Transfers between an integrated producer and its own converting plants • “Indexed” transactions, i.e. transactions whose price is determined by a formula based on published prices (whether from RISI or other source)
Price levels reflected	<p>Reference prices, i.e. the price negotiated each month that may serve as a basis from which customer-specific discounts are given based on the customer’s volume or long-term relationship with a supplier</p> <p>Assessments are presented as a range in which the bulk of transactions take place</p>
Arms-length transactions	Only transactions between unaffiliated parties are reflected. Transfers of integrated mills to their own box plants and trades with other integrated producers are excluded.

Point in supply chain	Seller: producer or a producer's agent Buyer: converter not affiliated with a producer of the grade in question, or packaging buyer if directly involved in purchase of paper/board
Delivery terms	Free delivered to buyer's facility unless otherwise noted. (Russian prices are ex-works, and some UK prices are CIF.)
Quality	Prices are for prime-quality tonnage with normal trims.
Normal terms of payment	Price estimates assume normal and customary payment terms.
Currency/units	Euro/tonne except for: UK: £/tonne Russia: Rouble/tonne
IOSCO categories	Testliner 2, 140g, Germany: Category 1 All others: Category 2 <i>See implementation of IOSCO's Principles for Price Reporting Agencies (www.risi.com/iosco) for definition of categories.</i>

Containerboard

Grade	Location	RISI Assessment ID	Currency	Frequency	Terms – free delivered, buyer's facility unless otherwise noted	Notes
Recycled containerboard						
Testliner 2						
125 g	Russia	1339	RUB	q	ex-works	Excludes 18% VAT. Prices reflect transactions which occurred in the central and northwestern regions of Russia.
140 g	France	61	EUR	m		
	Germany	60	EUR	m		
	Italy	63	EUR	m		
	Spain	141	EUR	q		Monthly prices are published retroactively.
	United Kingdom	62	GBP	m		

Grade	Location	RISI Assessment ID	Currency	Frequency	Terms – free delivered, buyer's facility unless otherwise noted	Notes
Testliner 3						
125 g	Spain	142	EUR	q		Monthly prices are published retroactively.
140 g	France	65	EUR	m		
	Germany	64	EUR	m		
	Italy	67	EUR	m		
	United Kingdom	66	GBP	m		
White-top testliner						
125 g	Spain	1161	EUR	q		Uncoated liner with a brightness of ISO≥70. Monthly prices are published retroactively.
140 g	France	1156	EUR	m		
	Germany	1154	EUR	m		
	Italy	1157	EUR	m		
	United Kingdom	1158	GBP	m		
Recycled Fluting						
100 g+	United Kingdom	71	GBP	m		
105 g	France	70	EUR	m		
	Germany	68	EUR	m		
	Italy	72	EUR	m		Recycled fluting prices reflect Italian qualities at the lower end of the range and other European qualities toward the top end.
112 g	Russia	1341	RUB	q	ex-works	Excludes 18% VAT. Prices reflect transactions which occurred in the central and northwestern regions of Russia.
127 g	Spain	140	EUR	q		This grade of fluting is made from 100% recovered fiber but is commonly known as semiquímico nacional (national semi-chemical fluting) or fluting tipo semiquímico (semi-chemical type fluting). Monthly prices are published retroactively.
90 g	United Kingdom	1009	GBP	m		
95-110 g	Spain	143	EUR	q		Monthly prices are published retroactively.

Grade	Location	RISI Assessment ID	Currency	Frequency	Terms – free delivered, buyer's facility unless otherwise noted	Notes
Virgin fiber containerboard						
Unbleached kraftliner						
125 g	France	458	EUR	m		
	Germany	473	EUR	m		
	Italy	450	EUR	m		Lower end of the range represents CIF prices for imported paper. Higher end of the range represents free delivered prices for European paper.
	Spain	477	EUR	q		Includes imports as well as European paper. Monthly prices are published retroactively.
	United Kingdom	438	GBP	m	CIF	Imports from continental Europe and other sources.
	Russia	1337	RUB	q	ex-works	Excludes 18% VAT. Prices reflect transactions which occurred in the central and northwestern regions of Russia.
150 g	France	457	EUR	m		
	Germany	472	EUR	m		
	Italy	449	EUR	m		Lower end of the range represents CIF prices for imported paper. Higher end of the range represents free delivered prices for European paper.
	Spain	476	EUR	q		Includes imports as well as European paper. Monthly prices are published retroactively.
	United Kingdom	437	GBP	m	CIF	Imports from continental Europe and other sources.
175 g+	France	48	EUR	m		
	Germany	47	EUR	m		
	Italy	50	EUR	m		Lower end of the range represents CIF prices for imported paper. Higher end of the range represents free delivered prices for European paper.
	Spain	136	EUR	q		Includes imports as well as European paper. Monthly prices are published retroactively.
	United Kingdom	49	GBP	m	CIF	Imports from continental Europe and other sources.
White-top kraftliner						
125 g	Russia	1338	RUB	q	ex-works	Excludes 18% VAT. Prices reflect transactions which occurred in the central and northwestern regions of Russia.

Grade	Location	RISI Assessment ID	Currency	Frequency	Terms – free delivered, buyer's facility unless otherwise noted	Notes
140 g+	France	52	EUR	m		
	Germany	51	EUR	m		
	Italy	54	EUR	m		
	Spain	137	EUR	q		Monthly prices are published retroactively.
	United Kingdom	53	GBP	m	CIF	
Semi-chemical fluting						
112 g	Russia	1340	RUB	q	ex-works	Excludes 18% VAT. Prices reflect transactions which occurred in the central and northwestern regions of Russia.
127 g	France	56	EUR	m		Reflects Nordic and other European qualities.
	Germany	55	EUR	m		Reflects Nordic and other European qualities. Nordic SC medium prices are reflected at the top end of the range, while other European qualities are shown at the lower end.
	Italy	688	EUR	m		
	Spain	689	EUR	q		Monthly prices are published retroactively.

Product specifications are as defined by CEPI (see <http://www.cepi-containerboard.org/download.php>)

Relative importance of data types in determining assessments

Testliner, recycled fluting

Directly considered data (***) to * = most to least important)

- *** Transaction prices
- ** Price offers made/received
- * Trigger prices
- * Participants' estimates of market levels
- ** Prices of comparable grades (testliner 2, 3): Prices of testliner 2 and 3 are normalized and used in each other's assessment. For instance, price data showing that the testliner 2 price has gone up by 10 euros is also counted as data showing that the testliner 3 price has gone up by 10 euros.

Influencing data (+++ to + = most to least important)

- ++ Prices in other countries (Euro zone): Prices in Germany, France, Italy and Spain all serve as influencing data in each other market.
- + Prices in other countries (UK): European prices are considered influencing data for the UK versa, but the link between price movements is much weaker than among Euro zone countries.
- + Other data: Inventories, currency exchange rate, trade flows such as import shipments in Europe and containerboard export shipments outside of Europe

Unbleached kraftliner

Directly considered data (***) to * = most to least important)

- *** Transaction prices
- ** Price offers made/received

- * Trigger prices
- * Participants' estimates of market levels
- *** Prices for other basis weights: Prices of 125g, 150g and 175g+ are all normalized and used in each assessment. For instance, price data for 125g is reduced by 15 euros and 30 euros for inclusion in the 150g and 175g+ assessments, respectively.

Influencing data (+++ to + = most to least important)

- ++ Prices in other countries (Euro zone): Prices in Germany, France, Italy and Spain all serve as influencing data in each other market.
- + Testliner prices: As testliner can substitute for kraftliner in certain applications, testliner prices are serve as influencing data for kraftliner prices.
- + Other data: Inventories, currency exchange rates.

White-top kraftliner, semi-chemical fluting

Directly considered data (**+ to * = most to least important)

- *** Transaction prices
- *** Participants' estimates of market levels
- ** Price offers made/received
- * Trigger prices

Influencing data (+++ to + = most to least important)

- ++ Prices in other countries (Euro zone): Prices in Germany, France, Italy and Spain all serve as influencing data in each other market.
- + Other data: Inventories.

Cartonboard

Grade	Location	RISI Assessment ID	Currency	Frequency	Notes
Coated Duplex (GC2)/Folding Boxboard					
270 g+	France	74	EUR	m	
	Germany	73	EUR	m	
	Italy	76	EUR	m	
	Spain	144	EUR	q	Monthly prices are published retroactively.
	United Kingdom	75	GBP	m	
White-lined chipboard (GD2)					
300 g+	France	78	EUR	m	
	Germany	77	EUR	m	

	Italy	80	EUR	m	
	Spain	145	EUR	q	Monthly prices are published retroactively.
	United Kingdom	79	GBP	m	
White-lined chipboard (GD3)					
320 g+	Italy	680	EUR	m	

All prices are free delivered, buyer's facility.

For description of different types of cartonboard, see CEPI's site:

http://www.cep cartonboard.com/?section=different_types_of_cartonboard

Relative importance of data types in determining assessments

Directly considered data (***) to * = most to least important)

*** Transaction prices

*** Participants' estimates of market levels

** Price offers made/received

* Trigger prices

Influencing data (+++ to + = most to least important)

++ Prices in other countries (Euro zone): Prices in Germany, France, Italy and Spain all serve as influencing data in each other market.

+ Prices in other countries (UK): UK prices are considered influencing data for Euro zone country prices, and vice versa, but the effect of exchange rate fluctuations makes this link somewhat weaker.

Sack Kraft Paper

Grade	Location	RISI Assessment ID	Currency	Frequency	Notes
Unbleached, 80g+	France	541	EUR	q	Monthly prices are published retroactively.
	Germany	539	EUR	q	Monthly prices are published retroactively.
	Italy	535	EUR	q	Monthly prices are published retroactively.
	Spain	665	EUR	q	Monthly prices are published retroactively.

	United Kingdom	537	GBP	q	Monthly prices are published retroactively.
Bleached, 80g+	France	540	EUR	q	Monthly prices are published retroactively.
	Germany	538	EUR	q	Monthly prices are published retroactively.
	Italy	534	EUR	q	Monthly prices are published retroactively.
	Spain	664	EUR	q	Monthly prices are published retroactively.
	United Kingdom	536	GBP	q	Monthly prices are published retroactively.

Prices are reported quarterly. All prices are free delivered, buyer's facility.

Relative importance of data types in determining assessments

Directly considered data (**** to * = most to least important*)

- *** Transaction prices
- *** Participants' estimates of market levels
- ** Price offers made/received
- * Trigger prices

Influencing data (*+++ to + = most to least important*)

- ++ Prices in other countries (Euro zone): Prices in Germany, France, Italy and Spain all serve as influencing data in each other market.
- + Prices in other countries (UK): UK prices are considered influencing data for Euro zone country prices, and vice versa, but the effect of exchange rate fluctuations makes this link somewhat weaker.

REVISION HISTORY

Changes to methodology and specifications will be tracked here.

October 2017 – Italian cartonboard name corrected and comment added on compliance regime

Description of Italian White-lined chipboard corrected to GD3 in the table and comment added on page 5 regarding RISI's current transition to a new compliance regime in the light of its purchase by Euromoney.