Recyclability of Packaging Products – Test Method, Scorecard and Results

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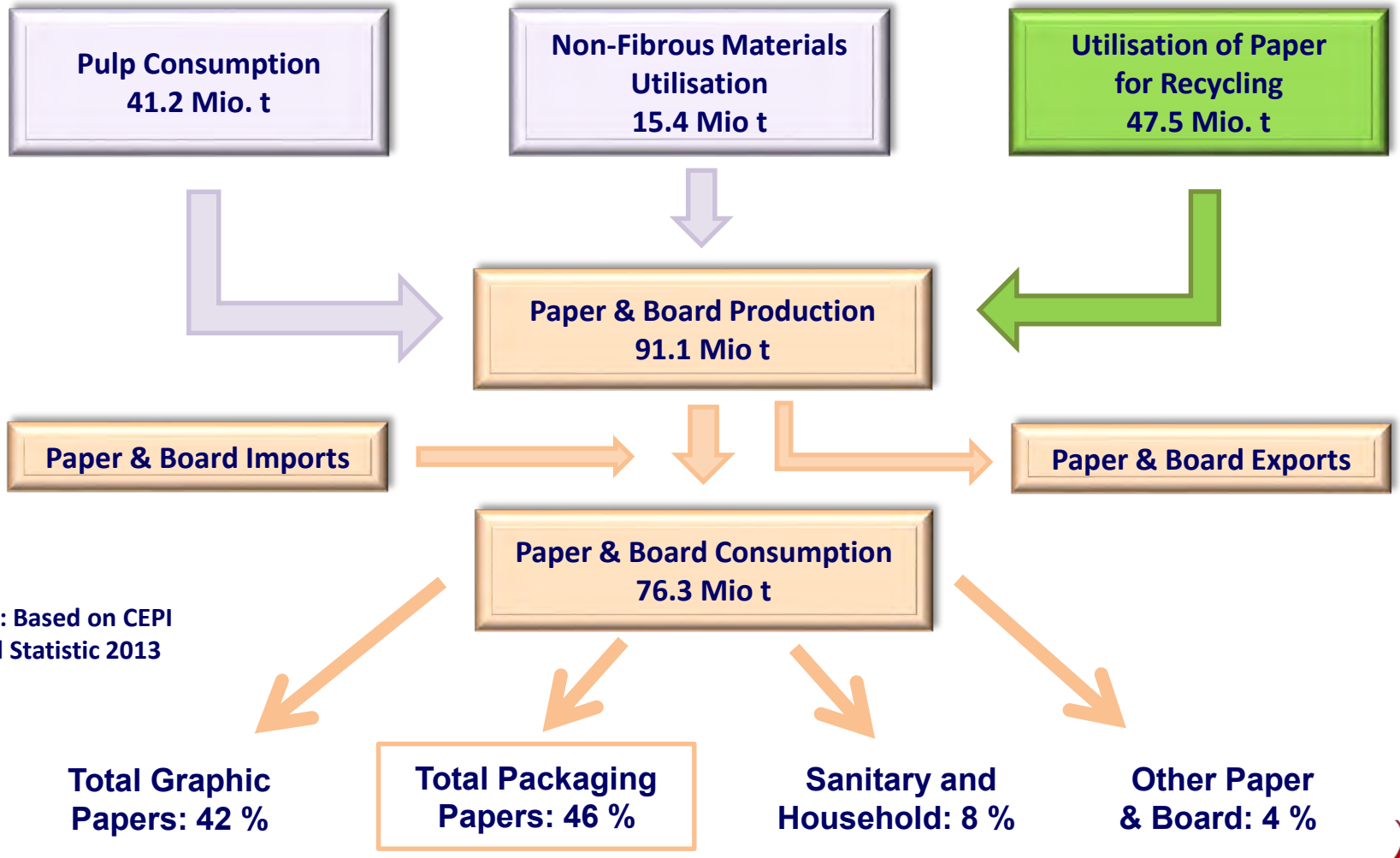
Content

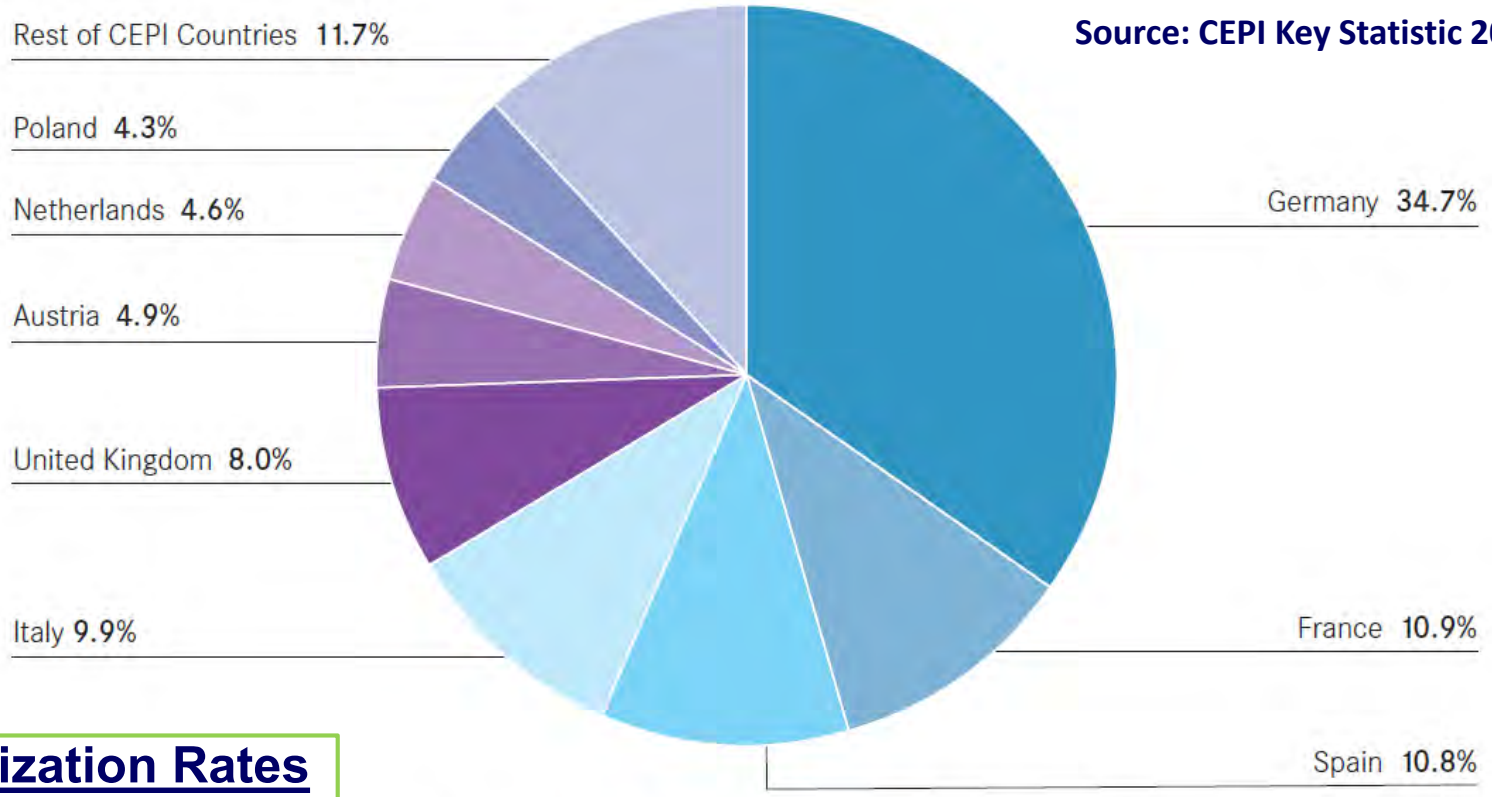
- Paper for Recycling – Demand, Production and Recycling
- Recyclability Test for Packaging Products
- Results of Recyclability Test of Packaging Products
- Score Card (Draft 5)
- Conclusions

From Raw Material to Paper for CEPI Countries 2013



Source: Based on CEPI Annual Statistic 2013

CEPI Utilisation of Paper for Recycling (PfR) by Country in 2013



Source: CEPI Key Statistic 2013

Total Utilisation of Paper for Recycling: 47.5 Million Tonnes

PfR Utilization Rates

CEPI: 52.1 %
Germany: 73.6 %
Poland: 50.4 %

Challenges of Paper Recycling

Products have to achieve certain requirements in order to ensure improved recycling loops

- **Repulpable – important for all types of paper products**
- **Adhesives have to be removable – important for all types of paper products**
- **Deinkable – important for all graphic paper grades**

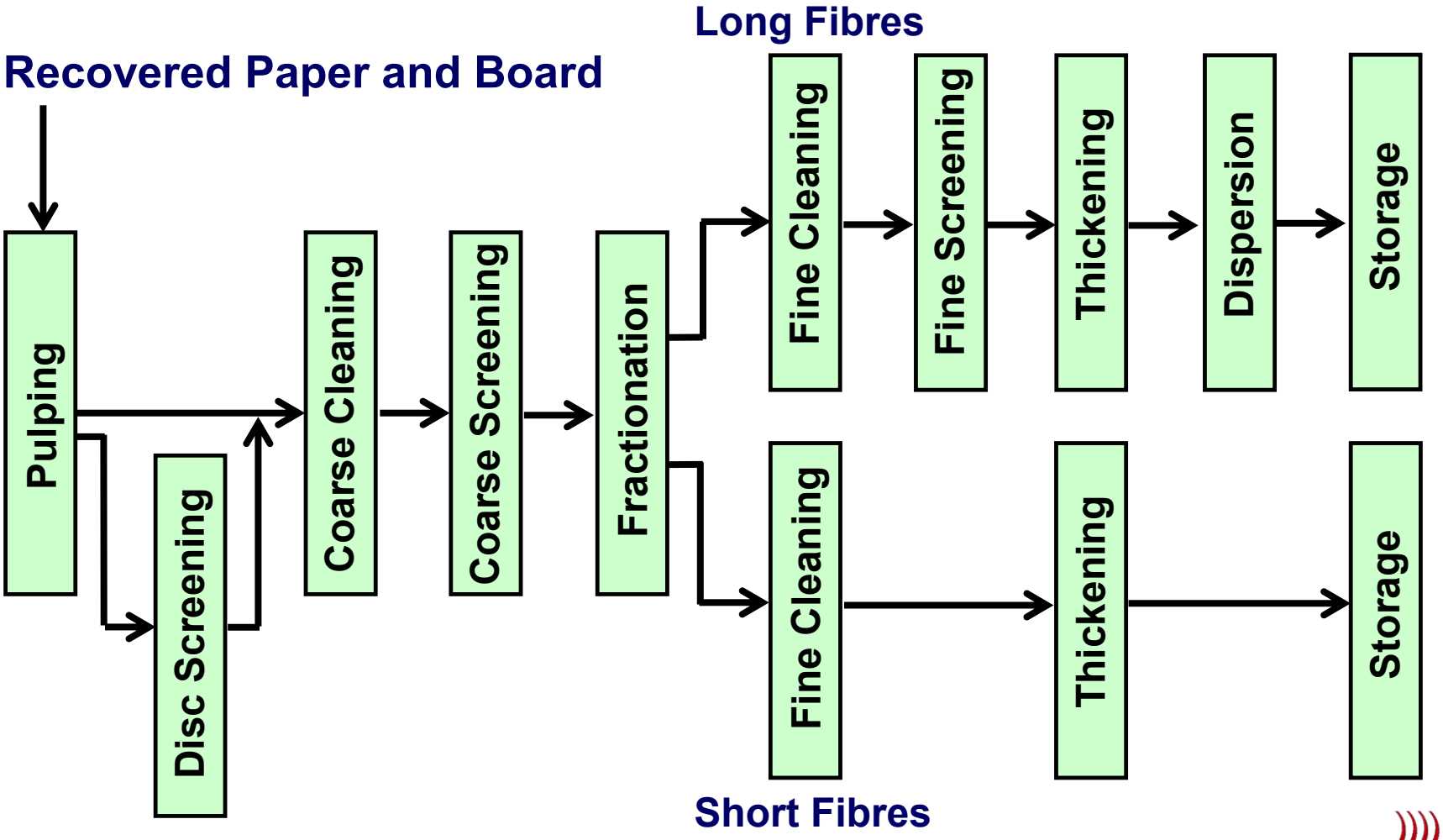
➢ **Test methods are needed to simulate a standard stock preparation**

Documents on Recyclability – Overview

	Test Methods	Assessment Schemes
Graphic Products	INGEDE Method 11 & 12 Assessment of – Print product deinkability – Fragmentation behaviour of adhesive applications PTS Method PTS-RH 021/97	Assessment of Print Product Recyclability – Deinkability Score – Adhesive Removal Score
Packaging Products	PTS Method PTS-RH 021/97 Aticelca MC 501-13 EcoPaperLoop Method 1 Recyclability Test for Packaging Products	Score Card for Recyclability of Packaging Products (Draft)

Recyclability Test for Packaging Products

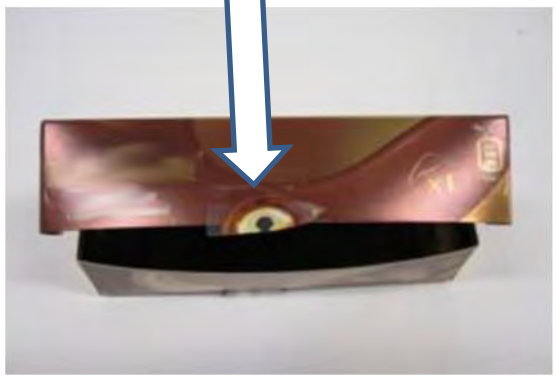
Typical Standard Stock Preparation for Packaging Products



Typical Packaging Products

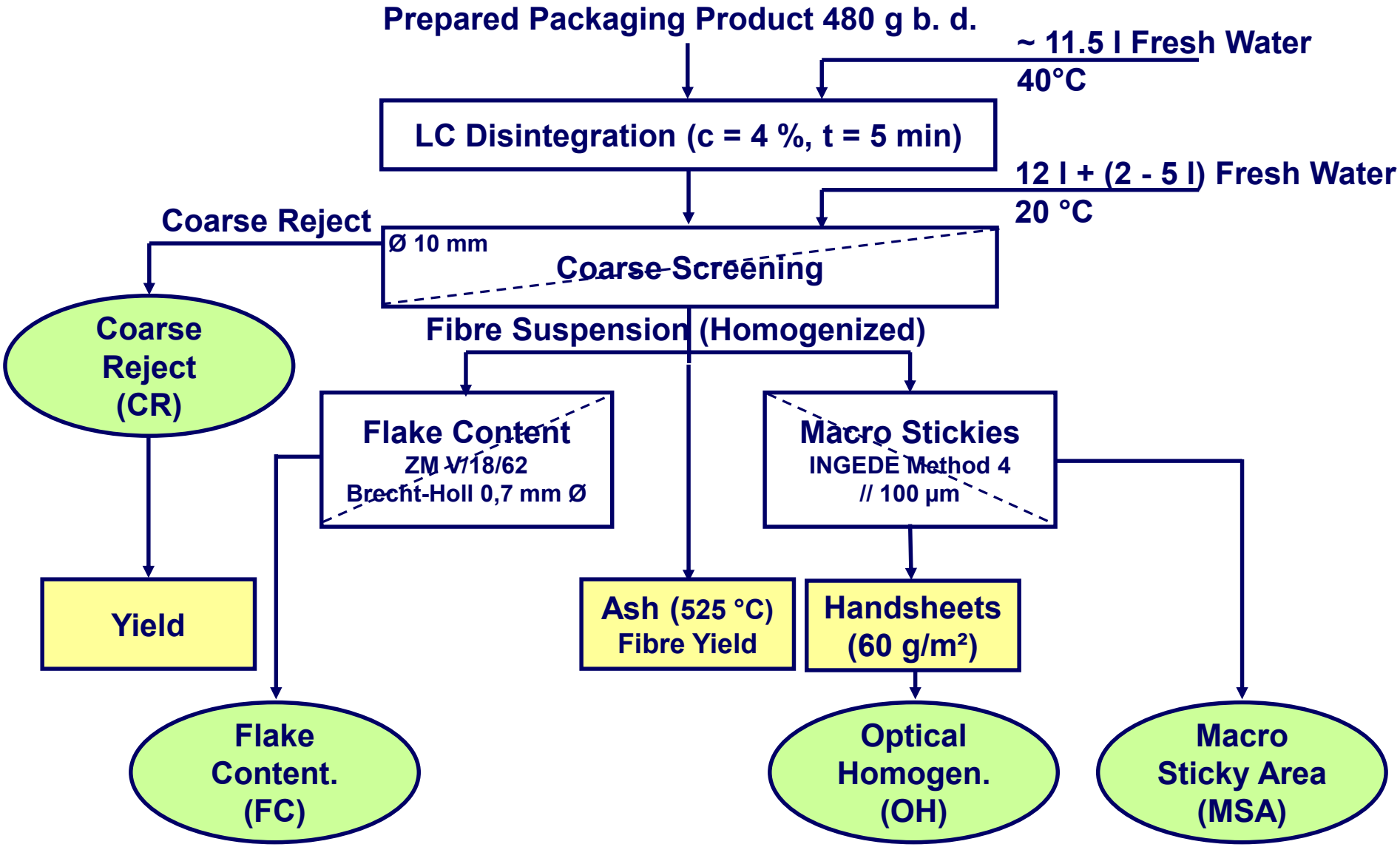
Non-paper product material
e. g. "window foils"
e. g. composite materials

Glued parts
e. g. Hotmelts or adhesive stripes



→ A problem for a standard paper for recycling stock preparation?

Recyclability Test for Packaging Products (EPL Method 1)



Major Equipment

LC Disintegration

Coarse Screening

Flake Content & Sticky Evaluation

Results of Recyclability Test of Packaging Products

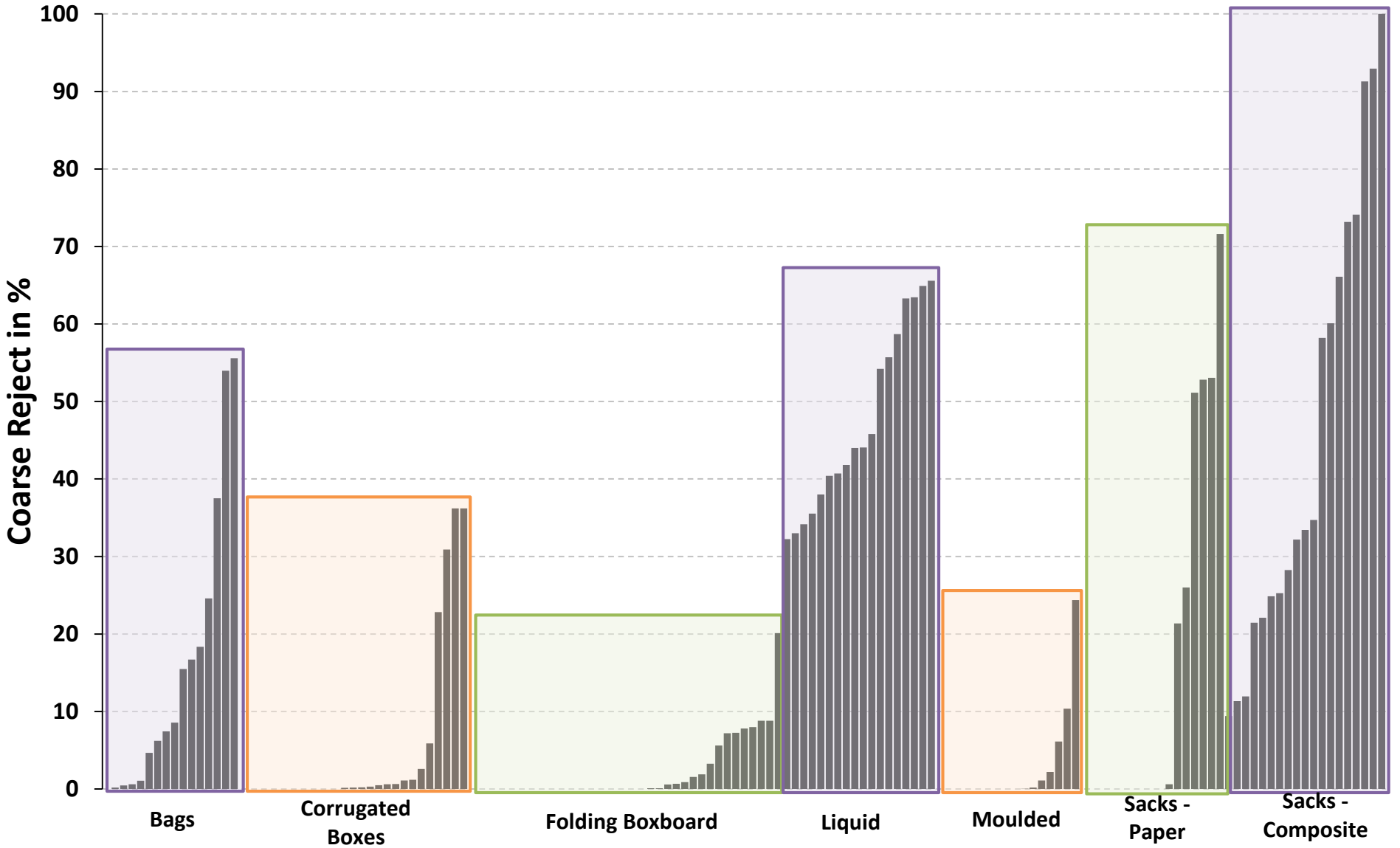
Investigated Product Groups

- Corrugated Boxes
- Folding Boxboard (for froozen food and other applications)
- Bags (with handles)
- Moulded Products
- Sacks (pure paper)
- Sacks (with composite materials)
- Liquid packaging
- Others

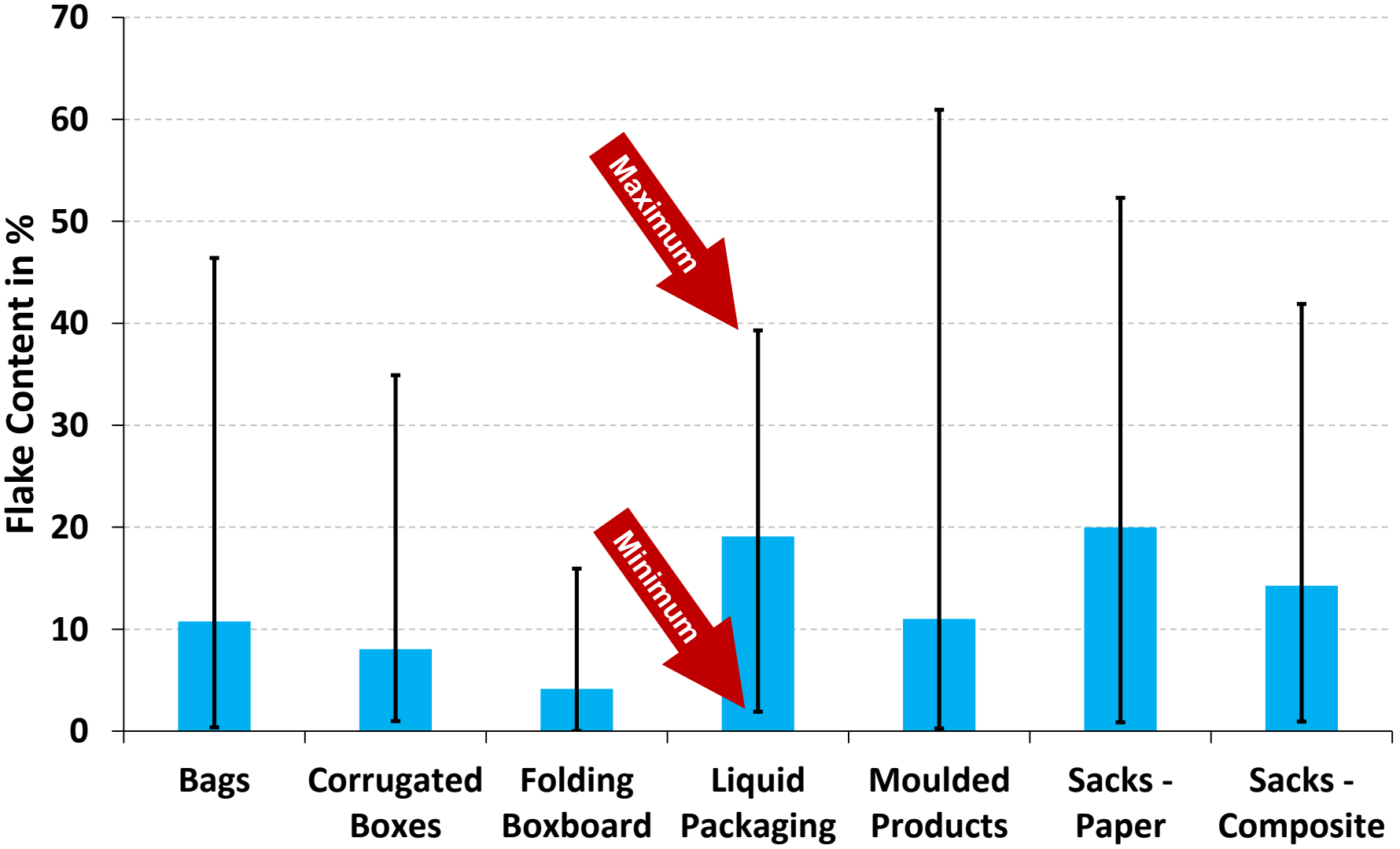
Investigated Parameters

- Coarse Reject (CR): coarse screening with 10 mm holes
- Yield of coarse screening
- Flake Content (FC): screening with 0,7 mm holes of the coarse screening accept
- Ash of the coarse screening accept
- Fibre Yield of the coarse screening accept
- Macro Sticky Area (MSA): screening with 100 µm slots of the coarse screening accept
- Optical homogeneits: visual inspection of handsheets of the macro sticky screening accept

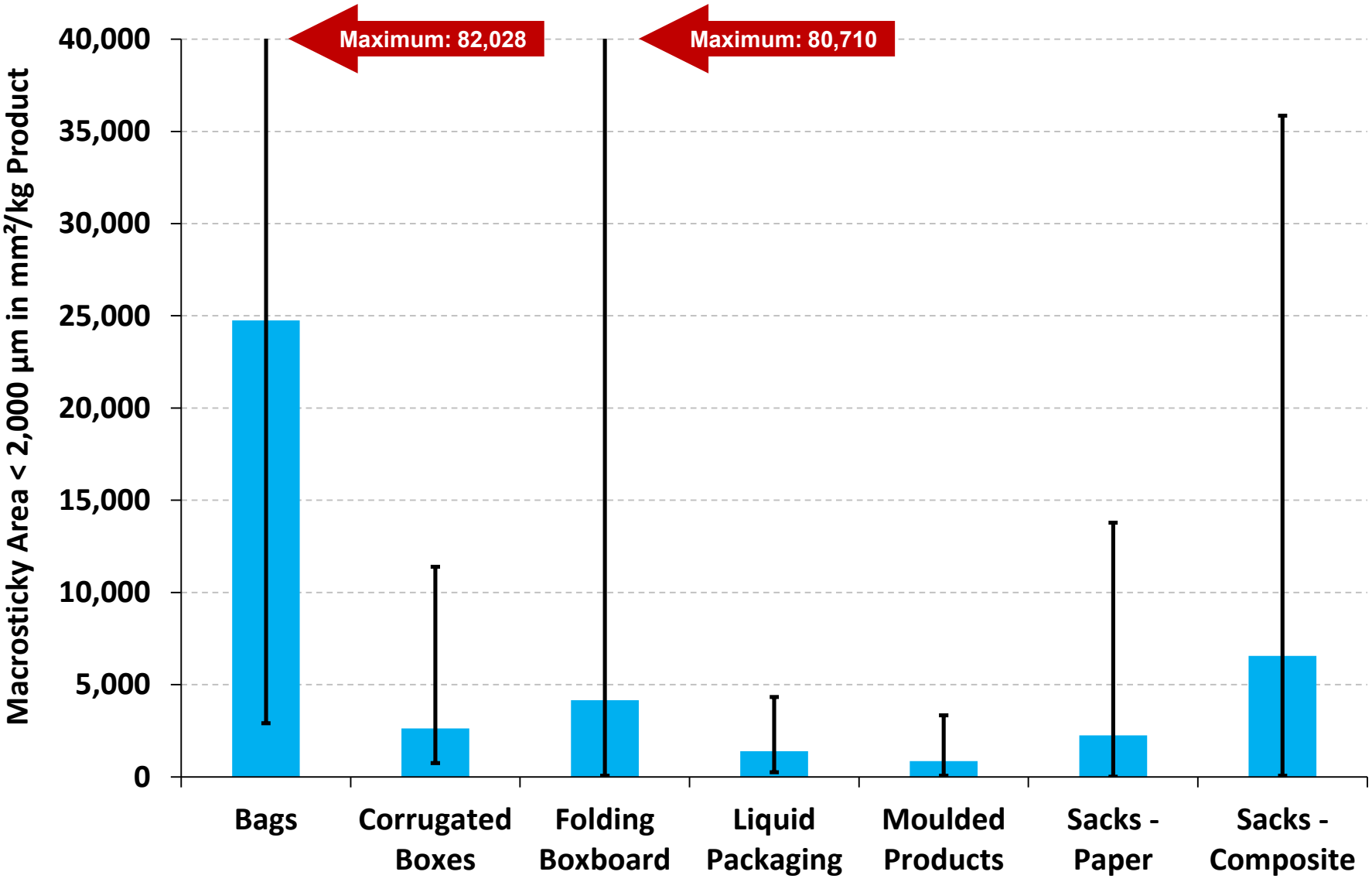
Coarse Reject of tested Packaging Products (Tested until 10.2014)



Flake Content of tested Packaging Products (Tested until 10.2014)



Macrosticky area of tested Packaging Products (Tested until 10.2014)



Score Card (Draft 5)

Recyclability Score Card (Draft 5)

Evaluation of recyclability for further improvements in material recycling within the paper industry

- **Products should be tested with final industrial seal**
- **Applicable to paper and board group 1 to 5 (acc. to EN 643) and not for paper products which are usually intended for deinking purposes**

Recyclability test have to be obtained according to

- **EcoPaperLoop Method 1 or**
- **ZELLCHEMING Technical Leaflet RECO 1 1/2014**

Recyclability Score Card (Draft 5)

- Differentiation of 9 packaging product categories (Bags, Corrugated Boxes, Moulded Products, …)
- Evaluation of 4 tested parameters from recyclability test

Parameter	Coarse Reject (CR)	Flake Content (FC)	Macro Stickies Area (MSA)	Optical Homogen. (OH)	Total
Maximum Score	35	15	40	10	100
	Process Parameters		Quality Parameters		

- Definition of threshold and target values (except optical homogeneity) for each packaging product category are under discussion

→ Recyclability Score from -100 to + 100

Recyclability Score Card (Draft 5)

Calculation of recyclability score according to achieved results

- **Comparable to Deinkability Score of ERPC**
- **Maximum score per parameter for all figures below target value**

Packaging Recyclability Score	Evaluation of Recyclability
71 to 100 Points	Good
51 to 70 Points	Fair
0 to 50 Points	Tolerable
Negative (failed to meet at least one threshold)	Not suitable for use in paper industry

Evaluation for the negativ score is still under discussion!

- **Another possible statement could be: „Not suitable for use in a standard paper mill*.“**

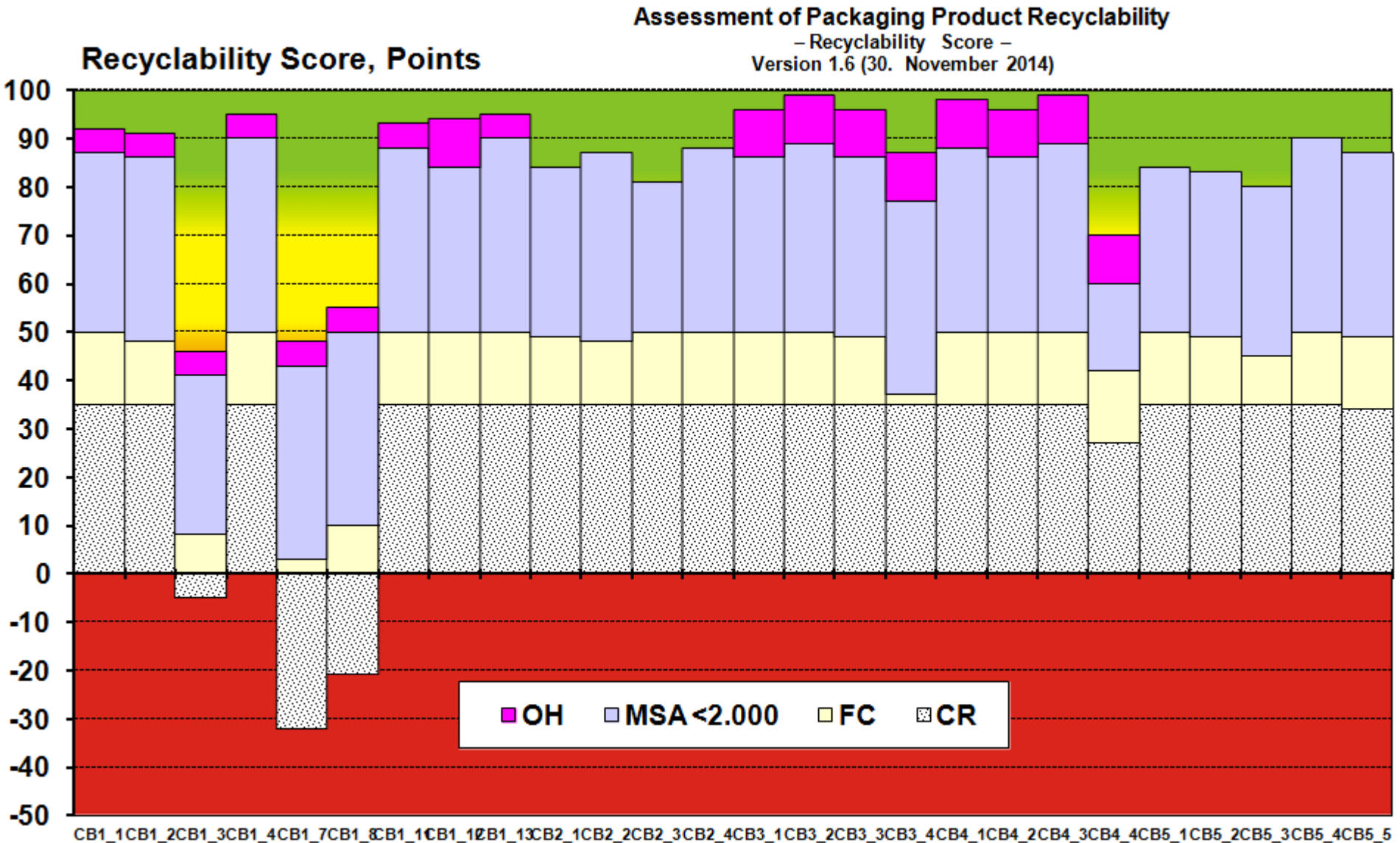
  *** Product should be supplied as separate paper for recycling grade and further investigations required for final assessment of the recyclability”**

Overview of the Results

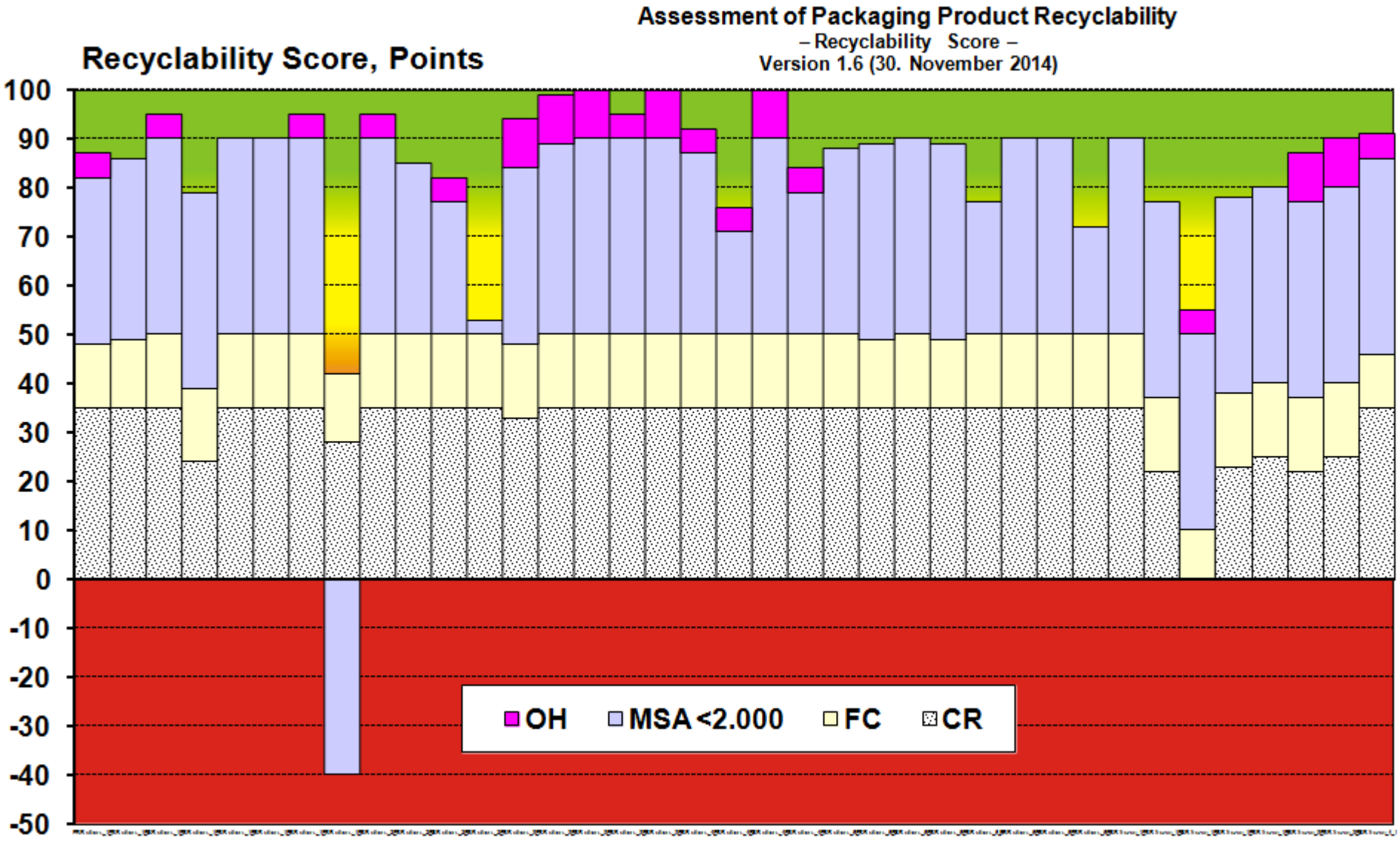
Minimum Value - (Mean Value) - Maximum Value

	Tested Products as No.	Coarse Reject in %	Flake Content in %	Sticky Area in mm²/kg
				< 2.000 µm
Corrugated Boxes	26	0 - (4.0) - 36.2	1,0 - (8.0) - 34.9	744 - (2,632) - 11,392
Folding Boxboard	36	0 - (2.2) - 20.1	0 - (4.2) - 15.9	200 - (4,551) - 80,710
Bags (handles)	16	0 - (15.7) - 55.6	0.4 - (10.8) - 46.4	2,904 - (24,755) - 82,028
Moulded Products	17	0 - (2.8) - 24.4	0.3 - (11.0) - 60.9	68 - (860) - 3,341
Sacks (paper)	17	0 - (16.3) - 71.6	0.9 - (20.0) - 52.3	8 - (2,254) - 13,779
Sacks (composite)	21	9.4 - (45.8) - 100	0 - (14.3) - 41.9	66 - (6,555) - 35,848
Liquid Packages	19	32.3 - (48.8) - 65.6	1.9 - (18.5) - 41.1	250 - (1,349) - 4,338
Others	7	0 - (11.4) - 38.1	2.0 - (7.1) - 28.4	115 - (14,851) - 53,967

Example of Score Points for Corrugated Boxes



Example of Score Points for Folding Boxboard

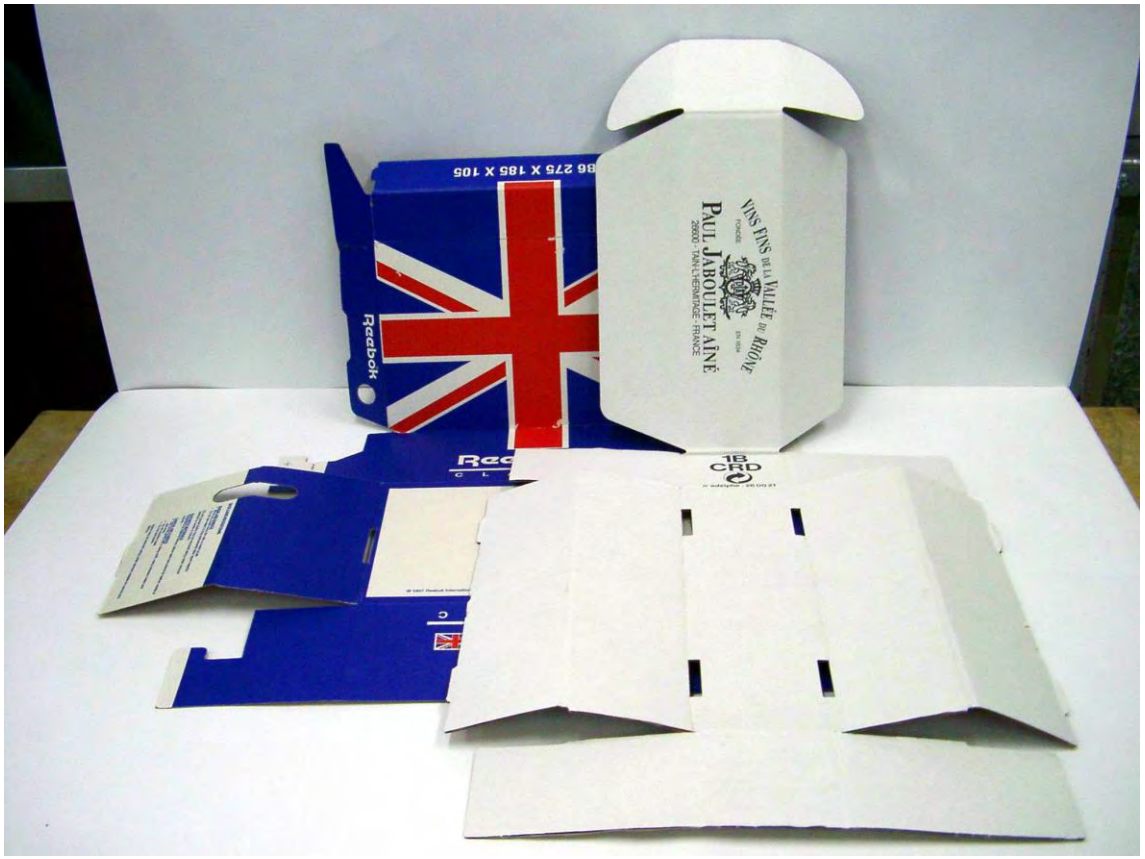


Conclusions

Conclusions

- Mainly packaging and graphic paper products are produced in the European paper industry
  → Paper for recycling is the major raw material for paper production
- A recyclability method was developed to benchmark the recyclability of packaging products in laboratory scale
  → Simulates conditions close to an industrial process of a standard stock preparation line
- Results of 159 investigated products show high deviations of the tested parameters within the same packaging category and between the various categories
- A score card for the assessment of the recyclability of packaging products is proposed within EcoPaperLoop, but has to be finalized by discussions between the industry partners of ERPC

Example of a Recyling Friendly Packaging Material



Thank you for your attention

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