EFIBCA news
European Flexible Intermediate Bulk Container Association

No 03, May 2012

EFIBCA is the voice of the European FIBC industry.
In this issue:

LEGISLATION, STANDARDS & TECHNOLOGY

Second Edition of IEC 61340-4-4 standard on Electrostatic classification of FIBCs released

The second edition of IEC 61340-4-4 " the adoption of a type classification system for FIBC based on four types: A, B, C and D. Electrostatics – Part 4-4: Standard test methods for specific applications – Electrostatic classification of flexible intermediate bulk containers (FIBC)" was published in January 2012. This standard specifies requirements for FIBC intended for use in hazardous explosive atmospheres.

The main changes compared to the first edition, published in 2005, comprise, amongst others:

- Guidance for safe use of FIBC in relation to hazardous areas and hazardous zones defined in IEC 60079-10-1 and IEC 60079-10-2 is added.
- Resistance to groundable points and electrical breakdown voltage measurements on FIBC shall be measured at low humidity only.
- Requirements for labelling FIBC are changed to improve clarity and ease of recognition by end users.
- Classification, performance requirements and guidance for safe use of inner liners in combination with FIBC are added.
- An informative annex giving guidance on test methods for quality control and inspection testing is added.


IEC 61340-4-4
Edition 2.0 2012-01
INTERNATIONAL STANDARD
NORME INTERNATIONALE
Electrostatics – Part 4-4: Standard test methods for specific applications – Electrostatic classification of flexible intermediate bulk containers (FIBC)
Électrostatique – Partie 4-4: Méthodes d'essai normalisées pour des applications spécifiques – Classification électrostatique des grands récipients pour vrac souples (GRVS)
INTERNATIONAL ELECTROTECHNICAL COMMISSION
COMMISSION ELECTROTECHNIQUE INTERNATIONALE
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More detailed information on the revised edition was provided in the EFIBCA Newsletter No 2 from May 2011 that can be downloaded from the EFIBCA homepage (www.efibca.com). The full standard can be purchased directly from the IEC web store at http://webstore.iec.org in the category "webstore". For further information please contact **i.schmidt@efibca.com**.

Declaration of Compliance according to EU Regulation No 10/2011 on Food Contact Materials

In the EFIBCA Newsletter No 2 from May 2011 we informed about the new "Commission Regulation (EU) No 10/2011 on plastic materials and articles intended to come into contact with food". The regulation applies since 1 May 2011.

According to article 15 and annex IV of the above regulation a written declaration of compliance shall be made available for plastic materials and articles, products from intermediate stages of their manufacturing as well as for the substances intended for the manufacturing of those materials and articles at the marketing stages other than at the retail stage. The German Association for Plastics Packagings and Films (IK) has prepared a standard form for declarations of compliance according to the renewed regulation which was made available to EFIBCA members.

The "declaration of compliance" form is available for download at the "EFIBCA member section" on our homepage (www.efibca.com). For further information please contact **i.schmidt@efibca.com**.

MARKET NEWS

FIBC Import Statistics 2011

Compared to 2010, the value of FIBC imports to the EU increased by 27% to a total of 339.2 million Euro in 2011 (see table 1). With these results the imports to EU member states have not yet caught up to the results of 2008 (358.8 million Euro), but 2011 is the second year of recovery.

Again, Turkey consolidated its leadership as FIBC exporter to the EU with a market share of approx. 40% (see table 2). India remained in second place and has improved its market share from 30% (2010) to 35% in 2011. Bags from China on the other hand are losing market share in the EU (11% of total import value). These three main exporting countries together assume approx. 85% of the total import value to the EU27 zone. As in 2010, Bangladesh remained on 4th place. Serbia overtook Thailand and is now the 5th largest importer of FIBCs to the EU. For more details please contact **a.schaefer@efibca.com**.

Table 1 Total Import of FIBC[1] to the EU27 (value)

	2011	2010	
	m €	m €	
Imports to the EU27	339.2	267.5	+27%

Source: EFIBCA 2012 (based on Eurostat)

Table 2 Top 6 Exporting Countries of FIBC to the EU27 (by value)

		2011		2010	
2011 Rank	Country	m €	Import Share	m €	Import Share
1 ➔	Turkey	133.2	39.2%	105.9	39.6 %
2 ➔	India	119.2	35.1%	80.5	30.1 %
3 ➔	China	35.8	10.6%	35.9	13.4 %
4 ➔	Bangladesh	15.5	4.6%	10.4	3.9 %
5 ↗	Serbia	10.8	3.2%	7.8	2.9 %
6 ↘	Thailand	7.7	2.3%	8.4	3.2 %

Source: EFIBCA 2012 (based on Eurostat)

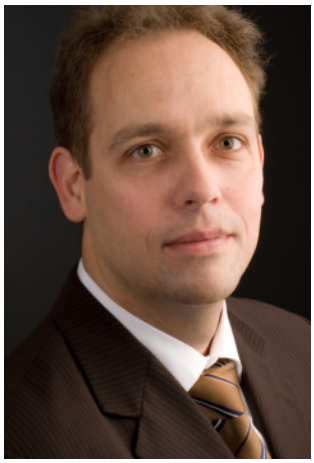
➔ no change in rank compared to the previous year
↗ up in rank compared to the previous year
↘ down in rank compared to the previous year

INTERNAL NEWS

New EFIBCA President and Council elected at the Annual General Meeting in Dubai

About 30 members, including four new member companies, participated in the Annual General Meeting that took place on 17 November 2011 in Dubai.

As every two years, the AGM had the responsibility to appoint a new President and Council. Oliver Grüters, General Manager of Boxon GmbH in Willich, Germany, was elected as President of EFIBCA by the Annual General Meeting. He succeeds Dr Amir Samadijavan, Greif, who had achieved to turn EFIBCA into a global organisation with a strongly growing membership.



Oliver Grüter, President of EFIBCA

EFIBCA Annual General Meeting 2011 in Dubai – desert safari

Oliver Grüters has over 15 years of experience in the FIBC business. He became General Manager of Boxon GmbH in 2001 and division manager of "Boxon Bulk global" at the Swedish parent company in 2009. His goals for his presidency of EFIBCA are to continue the globalisation process started by his predecessor, to enhance the information service for members and to further develop EFIBCA to a global competence centre for technical and quality related matters regarding FIBC. That will particularly serve the users of FIBC.

Abdul Mumit from Sinobangla Industries and Arnaldo Carbognani from Carbognani S.L.R. were newly elected into the Council. For an overview on the composition of the new Council, please see the box below.

EFIBCA Council Members

- Oliver Grüters, Boxon GmbH (President)
- Dr Amir Samadijavan, Greif Flexibles Germany GmbH (Vice President 1 for quality & technical matters)
- Christian Leeb, Starlinger & Co GmbH (Vice President 2 for public relations)
- Abdul Mumit, Sinobangla Industries Ltd.
- Arnaldo Carbognani, Carbognani S.L.R.
- Joan Climent, Climesa
- Roelof Veld, NNZ bv

The AGM also discussed and gave the go-ahead for EFIBCA's main projects - the development of EFIBCA-Cert certification scheme as well as a user guide on the safe handling of FIBC.

Important guests at the meeting were the President and the Vice President of the Indian FIBC association IFIBCA. The participants also enjoyed the opportunity to hear an insightful guest speech on the activities of Borouge, a joint venture of Borealis that is producing polyethylene and polypropylene in Abu Dhabi. The afternoon was dedicated to fun, relaxation and socializing. The members were invited to a desert safari in 4x4 vehicles and spent an Arabian night at a traditional camp site in the dunes.

INTERNAL NEWS

EFIBCA strengthens Influence on UN Recommendations on the Transportation of Dangerous Goods

EFIBCA made an important step towards strengthening its influence in the domain of the transportation of dangerous goods through joining the International Confederation of Plastics Packaging Manufacturers (ICPP) in July 2011.

ICPP represents the global plastic packaging industry at the UN Committee of Experts on the Transport of Dangerous Goods as an accredited non-governmental or-

ganization and is equipped with the rights of counselling and bringing forward motions.

The UN committee prepares the UN Recommendations on the Transport of Dangerous Goods, known as the "Orange Book", that are internationally widely accepted and form the basis of several international agreements and many national laws. The UN committee consists of about 30 country representatives with voting rights, plus about 15 country representatives and a number of accredited NGOs such as ICPP with a counselling role.

Benefits for EFIBCA are:

- Direct influence on the work of the UN Committee of Experts on the Transport of Dangerous Goods, including sending EFIBCA delegates to UN committee meetings in Geneva
- In particular influence on the UN Recommendations on the Transport of Dangerous Goods, known as the "Orange Book"
- A seat in the ICPP board.

The EFIBCA representative at ICPP is Vice President Dr Amir Samadijavan.

INTERNAL NEWS

EFIBCA Secretary Support

As of 1st April 2012 Annette Schaefer supports the EFIBCA Secretariat in Bad Homburg. She is holding a degree in Cultural Sciences and has been working for the IK since 2010. Amongst other responsibilities, she has also been holding the secretariat of EUMEPS packaging, the European association of EPS packaging industry. Annette can be contacted via **a.schaefer@efibca.com**.

Annette Schäfer, EFIBCA secretariat

INTERNAL NEWS

New EFIBCA members

EFIBCA warmly welcomes as new members:

Full Members:

- Assenova Krepost JSC, Bugaria
- Bluepack, The Netherlands
- Jumbo Plastics Industry, India
- Lou Blockx, Belgium
- Nebig Verpakkingen, The Netherlands
- Plastene, India
- Rishi FIBC, India
- Shuan Shin, Taiwan
- Sinobangla Industries, Bangladesh

Associate Member:

- Günter Kunststoffmaschinen, Germany

SPECIAL THEME

Mineral Additives – Properties and Perspectives for FIBCs

by Hannes Meier, M2 Consulting GmbH, Austria

"How many roads must a man …"

Since years the role of mineral fillers in plastics applications has changed significantly. From standard fillers of rather coarse particle sizes (d50 approx. 5 µm), just replacing more expensive polymers, they turned into functional additives creating added value in plastics end applications. In many cases plastics processors are facing today more or less standard polymers and are doing their modifications by themselves e.g. with high value mineral additives. Suffering from abrasion or bad mechanics of plastics end products is belonging to fairy tales meanwhile.

Last "mineral ice age" – From Powders to Masterbatches

With growth of polyolefinic applications, so different from widely known PVC applications, another challenge came into mineral additive suppliers' life. So far they had addressed their customers with mineral powders directly. To serve polyolefinic applications they first continued to supply their mineral powders to independent compounders, leaving the end customers for masterbatches to them. By that way they did not really learn about end customers' demands and problems. Just a very few of them started to compound by themselves on double screw extrusion or kneader systems, other

ones decided to engage toll producers (independent compounders) for production of their mineral additive masterbatches – so at least they started to address polyolefinic plastics processors directly again. For sure that brought the latest developments in mineral additive production. Especially calcium carbonate ($CaCO_3$) producers have left the PVC dinosaurier's age behind. At the same time, also direct addition systems were developed with machinery producers, allowing direct dosage of powdered mineral additives during plastics processing. But that technology never achieved a broader breakthrough. At least, it was the start of a route today via inhouse recycling systems where powders can be dosed into single screw extrusion and regranulation systems up to 30%, sometimes even up to 50%.

Minerals for and in FIBCs

As there are hardly any chemical interactions between minerals and polymers, particle sizes and shapes are good quality parameters to distinguish minerals. Cubic particle shape of $CaCO_3$ is nsoluing totally different than platy shaped talc or even needle shaped wollastonite (see figure 1). While cubic particles lead to moderate increases of tensile strengths (1% causes 1% increase of tensile strength), platy shaped minerals are enhancing the tensile strength quite nicely (1% causes ca. 3-5%). Ultimately, needle shaped particles are increasing most (1% could bring even 10% increase of tensile strength).

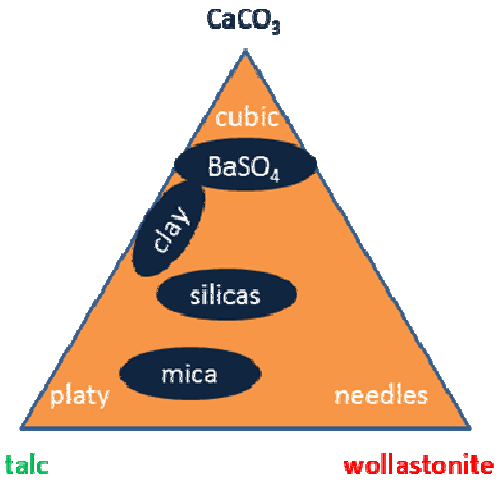


Figure 1 Particle Shapes of Mineral Additives

Any end user of these mineral compounds should not forget their hardness as well. While talc is the softest mineral worldwide (Mohs hardness 1), $CaCO_3$ is still a good compromise with 3. But wollastonite is already of Mohs hardness 6. This will have an impact on abrasive phenomenons, although very fine particle sizes beyond d50 of 2 µm are preferred anyway.

Technical parameter "price"

Especially $CaCO_3$ is available nearly everywhere worldwide. As given in figure 2 there are roughly 10 million tons of $CaCO_3$ used as mineral additives in Europe, for talc the picture is already looking quite different and the market 2010 in Europe was roughly about 1,2 Mio tons. For wollastonite the European market is not even 100,000 tons. Further milling technologies for $CaCO_3$ production are very common (ball mills), while talc and wollastonites are produced on energy consuming jet mills. All this leads to nice price differences for end customers, having unit 1 for a finely milled $CaCO_3$ with d50 of 2 µm, then ca. factor 5-8 for a comparable talc and even 15-20 for finest wollastonites.

All these reasons are crucial for having $CaCO_3$ as the number 1 of most widely used mineral additives with the best price-performance ratio.

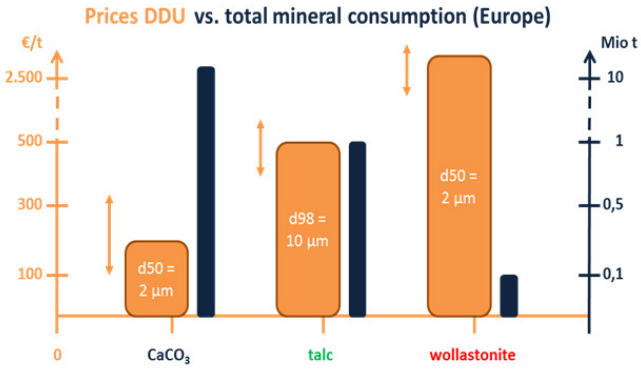


Figure 2 Consumptions of Mineral Additives and their Prices in Europe, 2010

Comparability of Calcium Carbonates

$CaCO_3$ is available in three modifications: as chalk, limestone and marble. However, only ca. 15% of $CaCO_3$ minerals available are chalks, the rest are limestones and marbles. They are distinguished by their crystallinity mainly. While chalks are fully amorphous, limestons are predominantly and marbles are fully crystalline. Unfortunatly, there is only one kind of datasheets for both modifications and many end customers are looking on whiteness only as quality parameter. But it is nonsense to compare marbles and chalks by whiteness. That makes sense within one $CaCO_3$ modification only, not between them.

At the same time the so-called "HCl-insolubles" (a general measure of $CaCO_3$ impurities) cannot be compared between chalks and marbles. Values for chalks are normally 3-5 times higher than those for marbles. But the kinds of impurities defined by HCl-insolubles are totally different. While HCl-insolubles are reflecting the content of soft-silicas (mainly clays) in chalks, they are giving the direct quartz content in marbles. At least quartz content is crucial for abrasivity, having Mohs hardness of 7. So marbles with 0.5% of HCl-insolubles are often containing more quartz than chalks with 2% insoluble!
Further there is also iron content which is creating a lot of confusion on datasheets. While iron compounds in chalks are based on Fe(II) ions, it is mainly Fe(III) in marbles. Of course the oxidative power of Fe(III) is much higher compared to Fe(II). Generally, there should be a comparison of Fe(III)-compounds in mineral raw materials. So again, any marble with 0.01% Fe (always measured as the Fe(III)-compound "Fe_2O_3") is acting even more destructive in polymers than chalks with 0.05% Fe, available as Fe(II).

Mineral Quality Assurance

Chalks have quite interesting properties for any plastics applications. For instance they are 10 times better electrical insulators than marbles, they are non-crystalline and therefore smoother and due to their surface porosity they are even acting as a kind of lubricant. So normally chalks should be the absolutely preferred type of $CaCO_3$ in any plastics application, except whiteness only is requested.
But to get a full picture of a product quality it is also crucial to have a close look on the compounding technologies for production of mineral filled masterbatches. A lot of changes have occurred in the past years. It became quite common to compound masterbatches with 80% CaCO3 loading. Any lower filler content is bringing direct disadvantages to customers' masterbatch prices. Polymers are still 10 times more expensive than high quality $CaCO_3$ additives. So any higher percent of loading brings nice efforts. But on the other hand there are also technical limits for $CaCO_3$ masterbatches with loadings above 80 %. These loadings can be achieved by compounding with high-MFR-polymers or oligomers only. In that case any masterbatch dosing will be limited by the quality of the polymer/oligomer masterbatch carrier, not by the amount of $CaCO_3$. Accordingly any savings due to slightly cheaper masterbatch prices are overkilled then by very limited addition levels.
Then other problems are arising like suffering mechanics, necking, dusting or dye-lip build up.

Melt filtration at 110 µm is a must today for adequate filler masterbatch quality, as well as a twin-screw system. Outputs of at least 2 tons per hour are necessary to remain competitive in the masterbatching field. Only a few masterbatches are able to serve this total product quality today!

Table 3 Quality Parameters for Mineral Additives

$CaCO_3$	values	Compounding	Values
Type	Chalk preferred	**MB concentration**	>= 80 %
D50	> 1,5 and < 2(,5) µm	**Polymer**	PPH (ev. LLDPE for dosings < 10 %)
D98	> 5 and < 10 µm	**MFR**	3
Fe(III) content	< 0,01 %	**Melt filtration**	110 µm
Specific surface area	> 2 and < 6 m^2/g	**Output**	> 3 t/h
Abrasivity	< 0,2 mg/3h	**Plant start**	> 2005

Finally, let me refer to often stated doubts against any mineral additives. Any influence of minerals on UV stability of FIBCs is mainly caused by high surfaces of minerals that are partially adsorbing UV stabilizers, making them again partially unavailable for their function to protect the polymer. Also too high Fe(III)-contents are critical, of course, but can be managed by using an adequate stabilizer package. Any experienced compounder will be aware of these facts and will take care to produce masterbatches with suitable formulations! Generally we should not forget to draw the attention to any polymer carriers of added masterbatches (for color, antistatic, minerals, etc.). The more these carriers are damaged by compounding, the deeper will be the impact on the final UV properties and mechanics of any produced FIBC. Even damaged stabilizers can cause heavily disturbing side reactions with acid sensitive calcium carbonate, leading also to in-situ developed agglomerates. This applies even the more with a certain level of moisture available in low ppm scale only.
Another disturbing phenomenon is dust formation when using mineral additive masterbatches. Again, it can be reported that firstly masterbatch loadings not above 80 % are beneficial; furthermore dispersion quality during compounding and granulation technology will have an impact. As critical pigment volume concentrations are permanently exceeded in 70-80 % loaded mineral masterbatches, there will always be a need to disperse powder dust on the masterbatch surface during extrusion of base films. Next by cutting a base film new surfaces are generated, allowing particles to appear on the borderline. Therefore a certain dust formation over time depending on the dosage levels will be quite normal. But whether this will become a real disturbing problem or not will be influenced mainly by the

masterbatch compounding quality inclusively its granulation technology again.

At least mechanical properties can be even nicely improved by choosing the right mineral composition, i.e. a certain share of talc inside a calcium carbonate masterbatch. But on the other hand there is always request for certain elongations as well. For sure any torn tape is not symptomatic for dosed mineral additives, much more caused by bad dispersion qualities, too coarse mineral additives (d50 > 3 µm or even 5 µm) and agglomerates.

Outlook

By carefully selecting both the right mineral additive and the most suitable compounding technology there will come a significant change in FIBC production, offering lower carbon footprints and better cost effectiveness. But there needs to be a focus on quality assurance for any masterbatch additives and - especially for loadings above 20 % mineral additive - an adaption of processing parameters. Higher loadings of mineral additives and excellent FIBC properties are for sure not contradictory, but all this needs time and should be implemented with well chosen partners step by step.

About the Author

Hannes Meier founded his own company, M2 Consulting GmbH, in 2007 in Hartkirchen, Austria. Core business is to consult about and escort plastics application developments on both machinery and raw material side, especially in connection with mineral additives. Before that Hannes Meier studied technical chemistry in Linz/Austria and worked for more than 10 years in a leading position on the international market field for the world's largest $CaCO_3$ producer.

Hannes Meier, M2 Consulting

UPCOMING EVENTS

FIBC Calendar

EFIBCA-Cert Committee Meeting
25 May 2012, Bad Homburg, Germany
www.efibca.com

Techtextil 2011 - International Trade Fair for Technical Textiles and Nonwovens
11-13 June 2012, Frankfurt, Germany
www.techtextil.messefrankfurt.com

FIBC World Congress
27-28 June 2012, Miami, USA
www.millenniumconferences.com

PackEX India, Mumbai, India
11-13 September 2012
www.packexindia.com

EFIBCA Council Meeting
13 November 2012, London
www.efibca.com

EFIBCA Annual General Meeting
14 November 2012, London
www.efibca.com

Orange: EFIBCA meetings
Lilac: external conferences