

PRESS RELEASE

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Sustainable Packaging for Beer

Packaging for beverages should be both economically and ecologically sensible

Beer and barrels – for centuries there has been no better way of transporting this noble brew from the brewery to the restaurant or inn. In the beginning the barrels were primary made of wood. This also had an important advantage to the environment: for the production an environmentally friendly and renewable resource was used. It is questionable though that this environmental awareness was a decisive decision-making factor back then. With our knowledge nowadays however nobody can and should be indifferent towards the necessity to treat the environment in a way that energy and resources are saved.

Both social values and consumer behavior have been changing – that’s particularly clear in Europe. For European brewers it is worth taking a look at new lucrative markets. Australia and the USA are booming markets – and Africa and Asia have become more important. Moreover, especially in the USA, the range of products has been changing because of the increasing amount of craft-brewers. Also in Europe the supply of craft beers has been rising in the last years. All these developments lead to fierce competition. Especially sustainability, the taste quality, flavor stability and constant product quality will be the decisive factors to lead to success in the future. This applies to the entire process chain in brewing – also and especially on the “last kilometers” to the customer.

Particularly the keyword **”sustainability”** is and will be of great importance in the future. Various breweries already perceived this trend years ago and started different environmental protection programs. What’s new though is the increasing tendency among breweries towards reviewing the environmental awareness in previous processes. In the course of such an examination they find out which measures have to be taken in order to avoid CO2 emissions.

Sustainability doesn't end with the consideration of the origin of the raw materials used but also comprises all logistical processes, from the brewery through the distributor to the Restaurant/Pub. In this process chain the global share of tapped beer is at 9 % (Plato Logic Limited, 2013, S. 14). Usually this beer is filled into stainless steel kegs. For years alternative packaging options in the form of PET containers have been available on the market. Many times logistical advantages in export are cited as reasons. In principle, all containers (both domestic ones and the ones in the export market) have to meet the following requirements:

- sustainability
- application security
- profitability

Sustainability

In a LCA-study (*Treeze, 2013*) initiated by Franke on the occasion of Drinktec 2013, a comparison between the sustainability of stainless steel kegs and disposable PET - containers was made. These areas were examined:

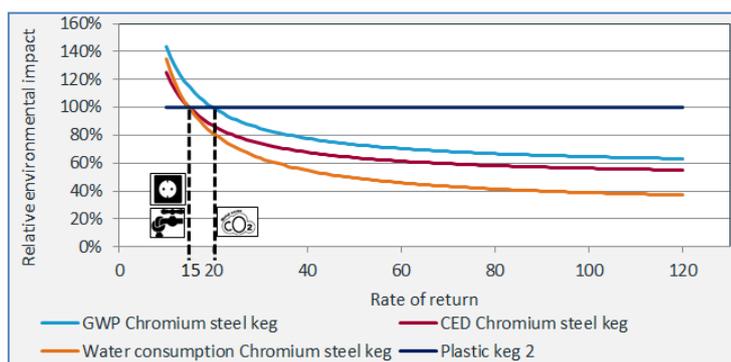
- Global Warming Potential (CO₂)
- water consumption
- energy consumption

Basis of this study were the following assumptions:

	Stainless steel keg	Disposable PET container
Container	1/6 bbl.(19.8l), 6 kg empty weight	20l, 1.05 kg empty weight
Delivery brewery	empty container	
Destination	Europe -> USA	
Distribution area around brewery	within a radius of 800 km	
Cycles per year	4	1
Service life of container	30 years	one-time use
Recycling	up to 100%	disposal on waste reprocessing plants

The essential factors in the evaluation are the manufacturing of the containers, the number of times it was used and when it comes to the stainless steel keg, the necessary return transport after having been used and the cleaning. The manufacturing of stainless steel kegs consumes a lot of resources and energy. However these values are put into perspective with a useful life of 30 years and about 120 uses in total. Every new use causes CO₂ emissions and consumes water and energy when the kegs are cleaned and filled. But since it is not a new product these values are significantly lower than in the production of

disposable PET containers. Summing up the environmental damage in the life circle becomes gradually less with each use. Even stronger is the degressive effect when the frequency of use increases. Thus it is clearly visible that both the examined values as well as the results arising from that depend very much on the usage frequency of the stainless steel keg.



When it comes to disposable PET containers however, the end of the life circle is already achieved after a single use and it has to be transported to waste recycling. In the process of collecting it from the Restaurant/Pub and feeding it to combustion or recycling it, CO₂ is emitted but this fact tends to be ignored in the overall view. Since it is a one-way system,

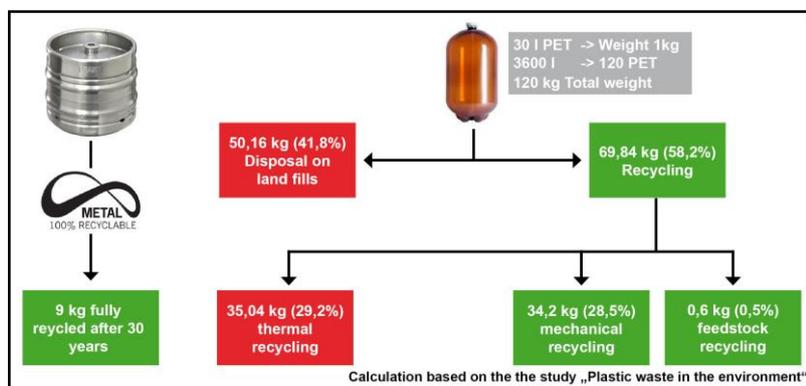
every production causes the same amount of CO₂-emissions, energy and water consumption. With regard to the life of a stainless steel keg, in the graph you can see a constant and permanent burden on the environment through disposable PET containers, whereas the figures gradually decrease in the course of a useful life of a stainless steel keg.

In the LCA analysis the break-even point – meaning the point when the count has turned in favor of the stainless steel keg - was as follows:

- Global Warming Potential (CO₂) -> 20 cycles
- Water consumption -> 15 cycles
- Energy consumption -> 15 cycles

On average the break-even point with stainless steel kegs is at 16.66 cycles. With four cycles per year and a useful life of 30 years this means: after a bit more than four years the **use of a stainless steel keg is more environmentally friendly than the use of a PET container.**

Stainless steel kegs have another advantage when it comes to recycling. A keg with the weight of 9 kg and a volume of 30 liters transports 3600 liters of beer in 30 years. At the end of its life cycle the stainless steel keg is scrap and goes to **100%** into the melting furnace of the steel industry. It is then a completely recycled raw material for newly produced stainless steel, thus lowering the primary demand for energy and resources in the production. Additionally, the owner of the keg can have economic benefits from the



steel kegs considering the current scrap prices.

The matter looks quite different when it comes to PET containers. For the same volume of 3600 liters in 30 years a total of 120 PET containers have to be used.

According to the study “**PLASTIC WASTE IN THE ENVIRONMENT**“

(*Environment, 2011, S. 66-74*) by the European Commission in 2011, plastic waste is recycled as well, but:

- only 29% are re-used as recycling material
- 41.8% of the plastic end up on landfills and take centuries to decompose and
- 29.2% are burnt in incinerators, emitting toxicities

In this example this means that 71% or 85.2 kg of the generated PET waste are either disposed of at a landfill or are thermally utilized – meaning a complete destruction of a raw material. Especially in countries with a poorly developed infrastructure where waste disposal is not publicly or privately organized, this increases the risk of environmental pollution. The long-term impairments to the environment through plastic waste becomes particularly evident in the Great Pacific garbage patch (*Blawat, 2010*).

Application Security

In an everyday handling of a beer barrel the application security is one of the most important factors. Both in breweries and in a Restaurant/Pub a **reliable and safe container** is important to protect the person and the content. Through negligence in the daily handling or technical defects on the filling machine the container can be excessively used. Here are a few examples:

- excessive preload pressure / excessive saturation pressure
- temperature-induced increase in internal pressure
- pressure build-up because of incorrect handling (e.g. falling down)
- incorrect supply of CO₂



Keg with opened safety burst disc

Modern stainless steel kegs are best equipped for these cases. According to the German ISO standard DIN 6647-1, containers up to 50 liters are expected to withstand pressure of at least 60 bar - without bursting! It is even safer to equip the kegs from the outset with a safety burst disc which opens at 50 bar, allowing overpressure to be released without danger. Such a strictly standardized regimentation however is completely missing when it comes to PET containers. In the USA though,

based on recent events, there has been increased awareness to define such standardization for the brewing industry.



Furthermore a packaging must not influence the **taste** of the beer. Barrels made of stainless steel are perfectly suited for that. The material stainless steel protects the content up to 100% from ingress of oxygen or UV-rays, a leaking of CO₂ is completely avoided. The taste stays the same since stainless steel is neutral to the content.

Profitability

With respect to sustainability and application security the stainless steel keg is at a clear advantage. The last point to be considered in the overall view is profitability and economic efficiency. The following aspects have to be taken into consideration:

- How high are the acquisition costs?
- How high are costs for logistics?
- How high are the handling costs (cleaning, keg-service) during useful life?
- How high is the loss rate?

The acquisition costs must be seen in relation to working life. A stainless steel keg is expected to have a service life of 30 years. In this period of time with 4 uses per year the stainless steel keg can be used 120 times. With a PET container however the acquisition costs are 100% for every new use. When calculating the CAPEX value for a 0.33l glass of beer of both containers, with regard to the following assumptions, one can come to this result:

	Stainless steel keg	PET container
Durability	30 years	one-time use
Cycles per year	4	1
Cycles in 30 years	120	-
Transported volume during use	3600 l	30 l
Acquisition costs 30 l keg	73 €	10 €
Scrap value	20 €	-
Total costs	55 €	10 €
CAPEX	0.005 €	0.11 €

The CAPEX value of **0.005 €** for each tapped glass of beer is a strong argument for the stainless steel keg. For an overall view costs for logistics and handling have to be considered as well. For this evaluation the assumption is that a total of 3600 liters of beer have to be exported over a distance of 800 km with one single container:

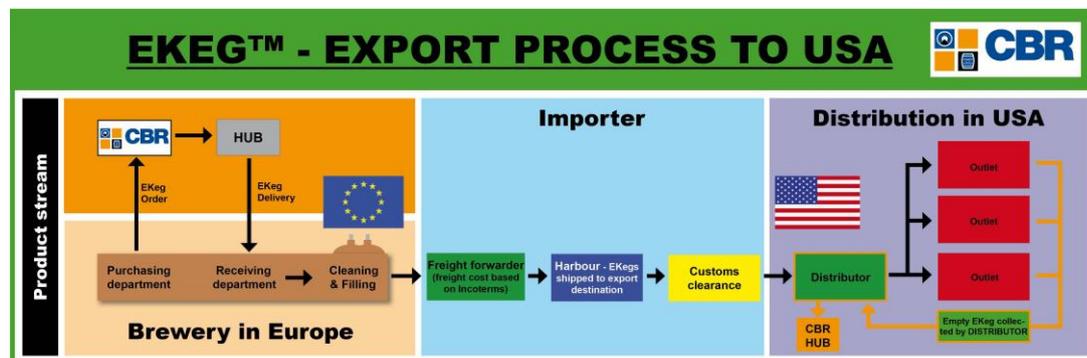
Assumptions	Value
Service costs stainless steel keg	7.00 €
Amount of keg service during useful life	4
Theft / loss of stainless steel keg in %	2
Cost for collection per stainless steel kegs in euro	1.00 €
Cleaning costs stainless steel keg in euro	1.00 €
Costs stainless steel keg in euro	720.35 €
Costs PET container in euro	1,215.39 €

When exporting to countries with a modern infrastructure one has to take into account that there are well-developed logistics and the rate of theft is relatively low. In countries having to deal with a high rate of theft, PET containers are a possible alternative. But as mentioned before, also PET containers have to be transported in order to be disposed, which involves additional costs. A sole PET one-way container therefore only exists in the consideration from the brewery to the customer, however completely ignores the waste disposal. From an economic perspective the stainless steel keg has, as a result, a lower CAPEX value and lower handling costs of about **500 €**. Taking the advantages of “**application security**” and “**sustainability**” into account, there is no better container than a returnable and reusable container made of stainless steel.

EKEG – the economic and economically friendly solution

Since 2013 breweries don't have to do without a safe, sustainable and economic stainless steel packaging for their export business anymore. **Close Brewery Rentals (CBR)**, a partner in the GNKS-network of Franke Beverage Systems, offers the **EKEG™** for the export business in its “Fill-and-Forget-

Program". These kegs are intended for a single use in the export business. The breweries don't have to care about the collection and the return transport anymore. This service is done by CBR.



The process is as follows: a brewery orders the desired amount of **EKEGS™** with CBR. For every EKEG a fee is charged for the receipt and use of the **EKEGS™**. After filling the kegs they are then sent to the customers via the usual distribution channel. Subsequent to that the empty kegs are collected by the distributor and are sent to the nearest exporter for the next use. This is where the ecological assessment comes full circle, since there are hardly any empty transports anymore and there is a potential for future economic advantages. For more information about the **EKEG™**-Program please visit <http://www.closebreweryrentals.co.uk/our-services/exportkegs/>. A worthwhile and ecologically friendly alternative for the export business.

Conclusion

For breweries, a reliable and sustainable packaging of stainless steel is both a long-term and safe investment into the future, as well as a commitment to environmentally responsible behavior. The stainless steel keg has established itself in the last years and has proven that the brewed beer arrives at the customer in the same quality as it left the brewery. Moreover, it meets safety standards already today and protects the user from possible injuries, even in case of improper handling.

About Franke Beverage Systems

Franke Beverage Systems is a leading global supplier of stainless steel kegs for the beverage industry and is part of the internationally active Franke Group (Aarburg, Switzerland). Franke Beverage Systems employs more than 140 people world-wide. Its headquarters are in Kreuztal, Germany and in the USA Franke has an additional service provider as well as global partner companies for keg services (www.gnks.info).

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Best regards

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