

Welcome to K show 2016 at KUHNE



It is hard to believe that three years have already gone by since the last K, the world's no. 1 trade fair for plastics and rubber. But at last it's time once again, and more than two hundred thousand visitors are expected to attend this event spread over 19 halls from 19 - 26 October in Düsseldorf to learn about the latest trends in the world of plastics and their processing.

As a global player with more than 60 years of experience on the market, the KUHNE Group will also be welcoming its visitors again in 2016 at its familiar stand – A41 in Hall 17. The three Group enterprises, KUHNE GmbH, KUHNE Anlagenbau and K-TOOL, will be presenting a myriad of

exhibits and innovations in a display area of over 250 m². In addition to interesting conversations and a snack at the trade fair stand, we will also be inviting our current and future customers to visit our main facility in Sankt Augustin where, on four trade fair days, two operating flat film lines which address the issues of X-PET and barrier films will be on show in our Technical laboratory center.

Moreover, KUHNE Anlagenbau will also present the world's first Triple Bubble[®] 13-layer blown film line. Please refer to the next few pages for more details on all three projects and machines.

We look forward to seeing you!



KUHNE Group in Sankt Augustin

INHALT

Welcome to K show 2016 at KUHNE	Page 1
X-PET – Yes we can „foam“!	Page 2
New high-performance 7-layer line for barrier films in KUHNE laboratory	Page 3
13-layer Triple Bubble [®] Always one layer ahead – with KUHNE ANLAGENBAU	Page 4
Delamination? We've never heard of it	Page 5
The Middle East – a KUHNE success story	Page 6
KUHNE Group presents the new image catalogue	Page 6
A further milestone for KUHNE geomembrane lines – Cooperation with a renowned German waterproofing membrane manufacturer	Page 7

X-PET

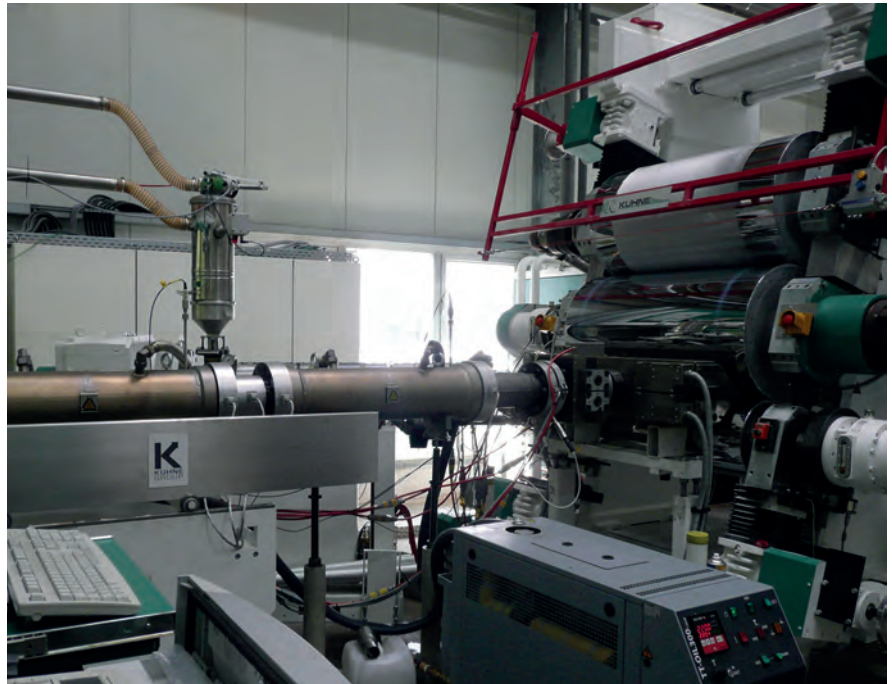
KUHNE – Yes we can „foam“!

In packaging business, PET is more and more replacing PS structures. PET has very good technical properties and stability. PS virgin can be almost twice as expensive as PET regrind / flakes and as bottles are made out of PET material, there is not much PS regrind available. In order to spare PET material by keeping the same film thickness and being able to produce the same density as PS at the same time, the market is demanding more and more for PET extrusion lines that can also process X-PET.

Systems for producing foam out of PS are already on the market successfully for some time. The extrusion in PET is more sophisticated; so is the production of foamed PET. As PET is hydroscopic, meaning it sucks water & humidity, the extruders work with degassing and venting. By dosing the gas into the barrel in order to produce foam, the risk to “de-vent” it again right afterwards is obvious. Also a modification of the line from XPET to rigid and back would be necessary in order to obtain optimum results for each of the two applications.

In 2016, KUHNE started a collaboration with the swiss company Promix in order to find a reliable solution for the inline-processing of foamed PET. Promix is supplying static mixing solutions and working on the field of foaming for some time. The KUHNE PET laboratory extrusion line was retrofitted with the equipment of the Switzerland based company. This enables the production of XPET and PET rigid in the optimum way in one line and by changing the production process by means of only the push of a button.

The foaming process works with an eco-friendly blowing fluid such as nitrogen or CO₂, which is added to the process by means of a highly-precision, massflow controlled Promix gas dosing system. For this purpose, a fluid injection module



Coextrusionline for X-PET in KUHNE Smart Sheets Lab

is installed downstream of the extruder allowing injection and premixing of the blowing fluid. A subsequent Promix cooling mixer ensures a controlled reduction of the melt temperature, which is key to achieve the required melt strength in PET foaming. The cooled and homogenized melt permits a regular foam expansion in the KUHNE flat sheet die and is being processed to a PET foamed sheet in the subsequent KUHNE roll stack. The unique cooling mixer technology hence enables the use of post-consumer plastics featuring a reduced IV for the production of high-quality PET foamed sheets.

Yet another advantage of our system: it is completely independent of the chosen solution for the extrusion in front of the line. Single or twin screw, hot air- or infra-red drying process or even a pre-installed decontamination system: the KUHNE/PROMIX foam installation always performs reliable, safe and on a constant quality level. The retrofit itself

can be done quite fast; only 2 m of additional length space have to be planned.

KUHNE Group Smart Sheets presents its X-PET solution live and under production real-time conditions during the K show in our lab in Sankt Augustin. You are sincerely welcomed on the 21st and 25th of October to take our cost-free shuttle bus from the show. Meeting point is the KUHNE Group booth A41 in Hall 17. Of course our customers will be brought back to Düsseldorf afterwards.

New high-performance 7-layer line for barrier films in KUHNE laboratory

Innovative features improve the already high standard of KUHNE multi-layer films

There is an increasing demand on the plastics market for machinery which can produce barrier films. The packaging produced – particularly in the food industry – enables the achievement of a considerably longer shelf life (i.e. the period of time in which the product can be sold as fresh). A continually growing area is the use of coffee and tea capsules, a segment in which KUHNE has sold numerous lines in recent years, and the same applies to meat and cheese packaging.

KUHNE Maschinenbau has been providing an optimum and, simultaneously, continually improving line solution in this segment for almost two decades. A new 7-layer barrier line will be demonstrated to our enthusiastic customers in our own laboratory both during and after the K show.

The following are a few of its special features:

- A gravimetric dosing system enables precision weighing / dosing in even the smallest quantities, particularly where expensive raw materials such as EVOH are involved.
- A PP output of more than 1,200 kg/h is achieved with a total of 5 extruders. The two high-speed main extruders with diameters of 70 and 60 take on the lion's share of the work in this respect. Both of these are equipped with water-cooled torque drives which have in the meantime proven their effectiveness hundreds of times over. It goes without saying that only familiar types from partners such as Oswald, Elin, Siemens or Baumüller are used here. The extruder cylinders are bi-metallic, while the screws (in-house products) are specially hardened. A further model with a diameter of 60 and two smaller extruders round off the range.

- The equipping of all extruders with melt pumps is a further highlight. The constant speed of the pumps ensures uniform application of the respective layer at all times. This leads to improvements in the production process and, consequently, a reduction in reject quotas. Furthermore, raw materials can be saved and layer thicknesses adapted to suit respective requirements.

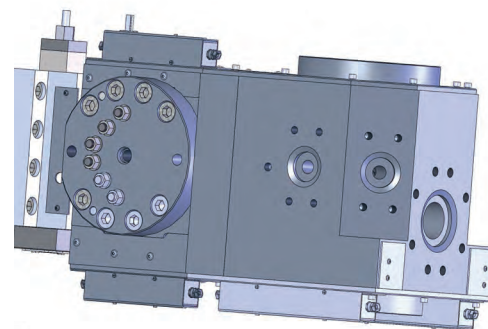
- The patented KU7 feedblock has proven its value many times over. It ensures the optimum distribution of layers over the complete working width. Expensive EVOH is applied in exactly the desired thickness, and an option is also available to apply less EVOH to the edges of the film where cutting or deep drawing is planned by closing the lamellas. This achieves clear financial savings.

- The thickness measurement and control unit supplied by SBI works capacitively. The system reacts automatically through an attachment on the KUHNE flat sheet die to deviations from the specified thickness tolerance. The desired tolerance can be achieved rapidly again through temperature application or removal (i.e. heating or cooling) on the affected position. A further new innovation is the ability of the unit to now also identify and measure the EVOH layer independently in the case of translucent films (i.e. films with very little or no colouring).

- The KUHNE Smart Sheets® roll stack has an overall width of 1,200 mm and a roll diameter of 300 mm. This means that net film widths of up to 800 mm can be produced for thermoforming applications. However, what really makes this design a high-performance film cooling line are the 9 additional cooling rollers downstream of the actual roll stack. Four of these are positioned on top, the other five on the bottom. With a diameter of 150 mm each and individual water cooling, the film can be uniformly treated on both sides. All post-cooling rollers are,

naturally enough, motor powered. Five heating and cooling units are employed for a total of 12 rollers.

- In addition to equipment such as an edge cutting unit and associated grinder and a conveyor, KUHNE also unveils its new FP 508 winder in this line. The winder, which is a completely in-house development and construction, can be operated in contact, gap or central mode and enables the achievement of a line speed of up to 150 m/min. Simultaneously, an accumulator can be dispensed with. Thin films in particular such as those used for lids can be wound rapidly without any problems in this manner, and space is also saved. Several of these winders have been successfully installed recently for European customers.



KU7 lamella feedblock

Following the K show, customers will be able to avail of the machine for demonstrations and tests, and it can also be purchased if desired.

KUHNE Group Smart Sheets® will be presenting this machine during the K show on the 20 and 24 October. A free shuttle bus will also be provided here to bring customers to and from the company. The meeting point is on the KUHNE Stand A41 in Hall 17 at 11.00 a.m.

13-layer Triple Bubble® blown film line

Always one layer ahead –

New machine technology for K 2016 at KUHNE ANLAGENBAU

The blown film division of the KUHNE Group – KUHNE ANLAGENBAU – is delighted to be back this year, still looking back on a highly successful K show 2013, and has numerous innovations to present at K 2016.

The technology leader in the area of multi-layer blown film lines is presenting its new image design at this year's K. A completely new website provides our customers with information on our product portfolio, and we are proud to be the only machine manufacturer to be able to provide every machine type used for the production of blown film from a single source.

These are:

Smart Bubble® – Air-cooled blown film. Equipped with our universal screw, this solution can be used to process practically every thermoplastic raw material – in a safe, user-friendly and highly efficient manner. Fields of application: industrial packaging, food packaging, technical films.

Triple Bubble® – Biaxially oriented blown film: The barrier master. This technology enables the manufacture of high barrier packaging, shrink bags and sausage casings.

Cool Bubble® – Water-quenched blown film: The all-rounder for film production. The shock quenching of hot melting films creates an amorphous polymer structure, which has a positive effect on the elasticity, transparency and the puncture and tear resistance of the film. Fields of application: thick-walled food packaging, thick-walled medical packaging.

The truth of KUHNE ANLAGENBAU's reputation as a barrier specialist will be put to the test on stand A41 in Hall 17 with the presentation of an innovative 13-layer blown film head.

Furthermore, the technology leader KUHNE ANLAGENBAU will be opening the doors at main facility in Sankt Augustin and demonstrating a 13-layer Triple Bubble® blown film line equipped with the latest Mo-Con® head technology.

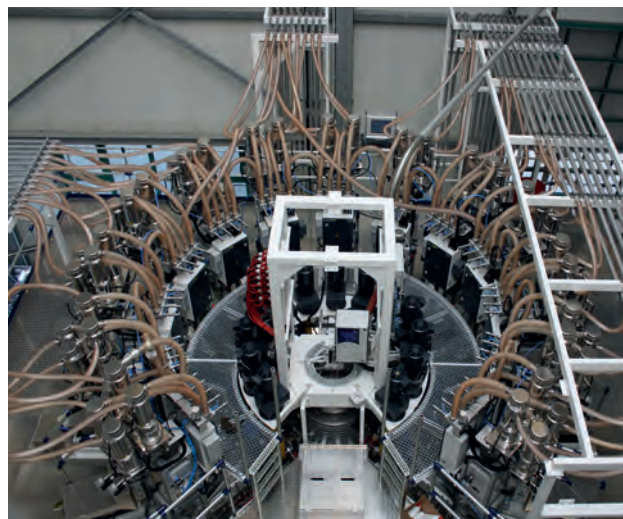
The 13-layer Triple Bubble® line, the first of its kind, will be producing live in Sankt Augustin on the following days: 10-20-2016, 10-21-2016, 10-24-2016 and 10-25-2016.



A shuttle service to Sankt Augustin and back to the trade fair venue will be provided for visitors – free of charge, of course. Why not drop by! The KUHNE ANLAGENBAU Team hopes that visitor numbers will be high and is looking forward to numerous interesting conversations.



The KUHNE ANLAGENBAU Team



The worldwide first 13-layer Triple Bubble® blown film line

Delamination? We've never heard of it KUHNE Smart Sheets® achieves maximum adhesion forces in PET/PE bond

KUHNE GmbH is proud to announce the installation of the third machine at the premises of its long-term partner, SP Group/Plastienvase from Córdoba (Spain): a high-performance PET extrusion line, including inline lamination and with an output of up to 1,600 kg/h. The thinnest PET films with a spectrum of 0.12 - 0.6 mm are manufactured on the line at a speed of up to 70 m/min.

The machine has only one extruder for manufacturing basic PET film, a Vacurema Basic System from Erema distinguished by the fact that moisture and dirt in the input material are removed upstream of the extrusion unit in the vacuum reactor. Even bottle flakes of up to 100% can be processed without difficulty in this manner. There is no necessity to produce a co-extrusion film, thanks to the Vacurema system food contact approval which meets the highest EFSA certification requirements. It is therefore possible to dispense with further extruders.

As the project manager, KUHNE GmbH ensured the installation of an efficient, high-performance machine which interacts perfectly with system components directly downstream. Two automatic dies – a PET die and a coating die – ensure precision settings and optimum film tolerances. KUHNE GmbH has employed an hydraulic GA 3.5-6 V/1,700 roll stack for thin films. The rollers can react flexibly in the case of high gap pressure in the roll gap, ensuring a minimum of roller damage (a significant criterion, particularly for thin films).

The core element of this machine is the inline lamination unit, a KUHNE development which is integrated in the line



PET co-extrusion line with inline lamination

shortly before the winder. To achieve perfect adhesion, a water-soluble and food-compatible primer is applied to the finished basic PET film in two steps, followed by PE melt. Lab tests have confirmed the success of this concept. It even proved impossible to delaminate the film after 48 hours.

KUHNE GmbH Smart Sheets® has succeeded in improving the primer unit considerably in this third line. A rotor priming unit which sprays the film with a precisely defined primer application represents a significant innovation in this context. The modular dryer subsequent to this enables individual configuration of drying intensity through the activation and deactivation of individual drying modules. This ensures that the film is optimally

prepared for the subsequent PE coating. With this successful project, KUHNE simultaneously underscores its core competence in several areas: PET extrusion for the food industry, coating and laminating and the production of thin films.

The Middle East – a KUHNE success story

As far back as 5 years ago, our CEO and Sales Manager Hubert Armbruster had become involved again in sales activities in the Middle East in order to acquire local sales partners in the southern Asian regions. These efforts paid off, with a contract being signed in 2013 for the construction of an 8 m wide geomembrane line for Rowad Geosynthetics, a globally active enterprise with its headquarters in Saudi Arabia which has specialised in the manufacture and processing of HDPE / LLDPE membranes using blown and now also flat films.

“The Middle East market is increasing in importance for us, as a lot of the raw materials used on our lines are sourced in this region”, explains Armbruster. Close proximity to raw material sources is a significant location factor, as processing times and routes are considerable shortened as a result. Armbruster managed to acquire many other major customers within the next two years, including the thermoforming manufacturer Al-Watania

from Saudi Arabia in 2015 for which KUHNE constructed and delivered two inline extrusion lines. Al-Watania had already purchased a blown film plant from KUHNE ANLAGENBAU eight years ago, and we are delighted to announce that we have also acquired this company for the area of machines for thermoforming films.

Only one year later, an offline extrusion system for the production of moulded lids for hot and cold drinks was constructed for the Arabian Paper Products Company (APPCO), a customer in the Middle East – a further major step in the opening up the Middle Eastern region. The reliability and competence of the KUHNE Group’s approach was undoubtedly decisive in this respect: “Rather than looking for the cheap line from the Far East, this shows an appreciation of quality German engineering and good service”, says Armbruster.

With the acquisition of a new sales partner for Iran since 2016, other promising



CEO and Sales Manager Hubert Armbruster

projects are already in the decision-making phase and will further strengthen the market position of the KUHNE Group in the Middle East.

Our experience is your future – KUHNE Group presents the new image catalogue

In addition to the three Group companies, KUHNE GmbH, KUHNE ANLA-

GENBAU and K-TOOL, the new company brochure also presents the structure and history of the Group itself.

respect, as without its commitment and ideas, our extrusion lines would simply be lifeless steel.

We have been searching for solutions to meet our customers’ challenges for more than 60 years, and the KUHNE Group will continue to dedicate itself to ensuring the right mix of tradition, innovation, service and flexibility in future.

The KUHNE image catalogue is available in English and German. It can, of course, also be accessed via our website at www.kuhne-group.com and is multimedia-capable (i.e. tablet and smartphone compatible). Why not take a look for yourself – we’re sure you’ll be thrilled!



Far from concentrating exclusively on our innovative mechanical engineering technology and developments in the complete spectrum of plastic applications, we have also focused on our outstanding Team in this

A further milestone for KUHNE geomembrane lines

Cooperation with a renowned German waterproofing membrane manufacturer

KUHNE took its first steps about 30 years ago on a long journey into the development and production of geomembrane extrusion lines. The first machine delivered at that time had a width of 3,600 mm. Numerous further installations followed over the years for the manufacture of geomembranes which are successfully used in production in many countries and on every continent.

Geomembranes are (mainly black) PE films which are frequently used for sealing. They are used outdoors and employed in mines and tunnel construction, landfill sites, artificial lakes and bodies of water, power stations and dams. As they are frequently seamed together into sheets of several hundred metres in length, as broad a width as possible and

a uniform distribution of thickness are important requirements. For this reason, KUHNE has continued to develop its extrusion lines right from the earliest days. This led to a continuous increase in the width of subsequent machines, ranging from four and six metres to net widths of eight metres.

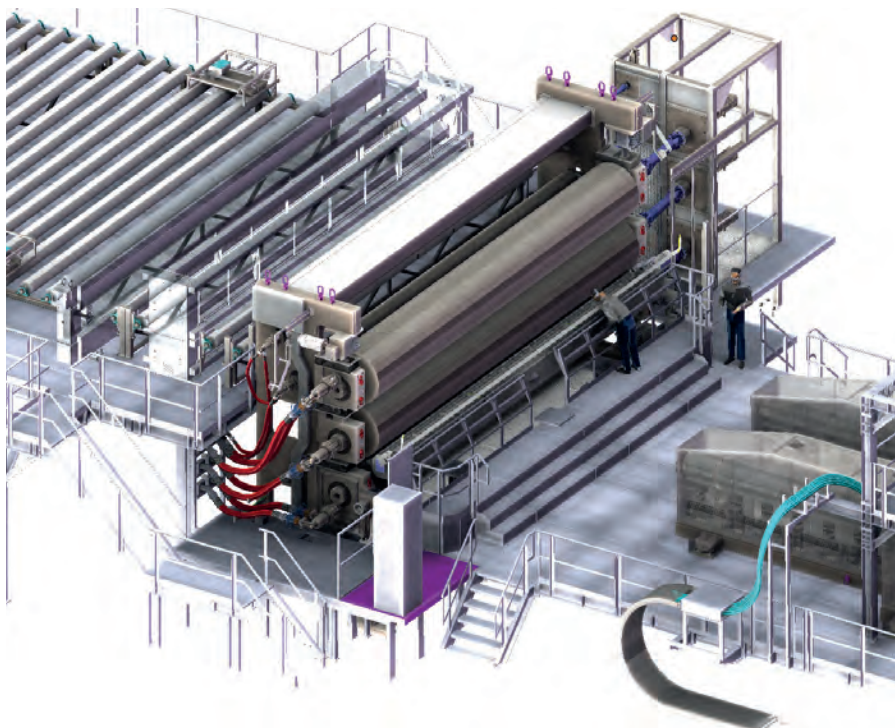
A thickness measurement and control solution was implemented in the most recent projects – and in the latest one. This guarantees a uniform thickness profile at the greatest working width with tolerances of up to 3 % at a main thickness of 1.5 mm.

Following two major orders for Algeria (7,000 mm net) and Saudi Arabia (8,000 mm net), the current system for a Ger-

man customer – a leading European geotextile and PE membrane manufacturer – incorporates further technical innovations. The thickness control which is also employed here is realised this time using a maku-DieTool. Restrictor bar adjustment is also possible, and this is optimised by the maku-DieTool using stored recipe management. Instead of the usual thermal pin control (sometimes involving up to 300 pins), this results in an annual five-digit saving in electric power costs.

The circle has therefore been completed (if initially only for Germany) with this mutual project which began 30 years ago. The line will be delivered in autumn 2016.

KUHNE Group / SmartSheets® has gained an excellent reputation and USP when it comes to the realisation of major projects in the area of geomembrane lines. Current activities even involve projects which include the entire in-house logistics. In addition to cranes, forklifts and the provision of cooling water, this also means that KUHNE needs to plan the facilities available in all its labs. Moreover, in addition to the machine itself, peripherals such as recycling, cold water treatment and production hall engineering are also often offered and laid out in planning.



Coextrusion line
for PE membranes

Our experience is your future.



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