

WITTMANN BATTENFELD at the K 2019威猛巴頓菲爾在 2019 K 展**WITTMANN BATTENFELD and Zeroplast at the K 2019 with injection molding process for the natural material Zeroplast free**

威猛巴頓菲爾和 Zeroplast 公司在 2019K 展共同完成零塑膠天然材料的注塑工藝。

“Circular Economy” was the motto of the K 2019 and is the largest common denominator in the cooperation between WITTMANN BATTENFELD and Zeroplast. The bio-based natural material is not only recyclable, bio-compatible, free of genetically modified organisms (GMOs) and chemical additives, but is also said to fulfill all the wishes and requirements of industrial customers. In addition to the criteria already mentioned, these include industrial series production by injection molding, a positive environmental balance, a bio-based barrier layer for cosmetics and foodstuffs, as well as competitiveness in pricing, processes and quality standards. The ingredients of Zeroplast free do not compete with animal feed or food production.

“循環經濟”是 K 2019 的主題，是威猛巴頓菲爾與 Zeroplast 公司合作的最大共同點。這種基於生物的天然材料不僅可回收且具備生物可相容性，亦不受不含轉基因生物（GMO）和化學添加劑影響，可以滿足工業客戶的所有願望和要求。除了已經提到的標準之外，這些標準還包括通過注塑成型進行的工業化批量生產，積極的環境平衡，化妝品和食品的生物基阻隔層以及價格，工藝和質量標準方面的競爭力。Zeroplast free 的成分與動物飼料或食品生產的原料完全不同。

“We have invented the sustainable, all-purpose bio material”, says Friedrich Breidenbach (CEO and co-founder of Zeroplast) with a twinkle in his eye. The facts & figures about the joint development work really read like the program for a request concert organized by industrial customers from the cosmetics, food and toy sectors. This has been made possible by the expert knowledge of WITTMANN BATTENFELD and Buzek Plastic, Poland in injection molding and process technology, the cooperation with leading research institutions, universities and an award-winning EU Horizon 2020 project under the leadership of the Fraunhofer ISC and Fraunhofer IWKS institutes, as well as the material development carried out by Zeroplast to create Zeroplast free. Due to batch variations in natural materials, new developments in areas such as programming and process technology became necessary.



“我們發明了可持續的，通用的生物材料”，弗雷德里希·布雷登巴赫（Zeroplast 的首席執行官兼聯合創始人）眼神閃爍的說道。有關聯合開發工作的事實和數據的確像是由化妝品、食品和玩具行業的工業客戶所組織而成的一場點歌音樂會一樣。

威猛巴頓菲爾和波蘭 Buzek Plastic 公司在注塑成型和加工技術方面的專業知識，以及 Zeroplast 公司 Zeroplast free 材料的研發，使得他們與研究機構、大學之間的項目合作以及在 Fraunhofer ISC 和 Fraunhofer IWKS 的領導下榮獲 2020 年 EU Horizon 歐盟地平線 2020 獎的項目之間的合作成為可能。

由於天然材料的批次變化，有必要在編程和處理技術等領域進行新的開發。

Michael Wittmann and Friedrich Breidenbach were agreed on one thing from the very beginning: “100% bio-based, zero compromise. At the K 2019, we will not present just a concept, but an almost market-ready solution. Throughout the entire development process, we have focused on meeting the requirements of our industrial customers, which is vital for application in real competitive situations. In this, we have been successful. Solutions are only sustainable if they can be brought to market in large numbers of units. Only integrated, intelligent and cost-efficient material compounds and production processes have a chance there.”

Michael Wittmann 和 Friedrich Breidenbach 從一開始就達成一致理念：“100%基於生物，零妥協。在 2019K 展上，我們將不僅提出一個新的理念，而且還將提出一種幾乎適用於市場的解決方案。在整個開發過程中，我們一直專注於滿足工業客戶的需求，這對於在實際競爭中的應用至關重要。我們已在這方面取得了成功。解決方案只有能夠大量投放市場才能實現可持續發展。只有進行綜合的、智能的和具有成本效益的材料與生產的結合才能獲得成功。”

At the K 2019 WITTMANN BATTENFELD demonstrated live the production of a packaging product for the cosmetics industry made of the bio-based compound Zeroplast free, which consists of no more than 3 ingredients. On the multi-component machine model *EcoPower 240/1100H/130L COMBIMOULD*, cosmetic jars and lids were manufactured from this compound based entirely on natural materials, which can be recycled without losing any of its physical properties.

在 2019 年 K 展上，威猛巴頓菲爾公司現場展示了化妝品行業包裝產品的生產過程，該產品僅包含三種成份的生物基混合物 Zeroplast free 材料製成。在多成分射出機 *EcoPower 240 / 1100H / 130L COMBIMOULD* 型號上，化妝品罐和蓋子完全是使用這種材料製造，該材料完全基於天然材料，可以在不損失任何物理性能的情況下進行回收。

The jar was injection-molded by the machine's main aggregate, while the L aggregate produced the lid in a different color. The machine was equipped with a W842 pro robot from WITTMANN, which took a round paper label made of certified cradle-to-cradle paper from a magazine and inserted it into the moving mold half for the bottom of the jar. Next, the W842 pro removed the parts from the nozzle side and passed the jars on to a W818 robot, which inserted them into a screwing station. The W842 pro brought the lids to the screwing station, where they were united with the jars and then deposited.



瓶身由注塑機的主注塑單元注塑噴射而成，顏色不同的蓋子則由第二個 L 型的注塑單元製成。該機器配備了威猛的 W842 pro 機器手臂，移取由料倉中由再回收紙製成的圓形紙標籤，並將其嵌入模具中瓶身底板位置。隨後，W842 pro 從定模側取出零部件，並將瓶身傳遞給威猛 W818 型機械手臂，最終將它們置於螺桿旋轉終端。

The preceding in-mold labeling process reduces the complexity of the materials in the packaging product. Use of the paper label ensures efficient recycling processes and thus provides recyclable and sustainable decoration of the packaging products. Michael Wittmann and Friedrich Breidenbach comment: “Sustainable solutions must not be a sacrifice. If they are worse or less attractive, they will not be accepted by the market.” 先前開發的模內貼標工藝減小了包裝業材料的複雜性。使用紙質標籤可確保高效的循環過程，因此能夠實現包裝材料可回收的且可持續的裝飾工藝。Michael Wittmann 和 Friedrich Breidenbach 評論說：“一定不能放棄可持續性解決方案。如果它們很糟糕或不那麼有吸引力，現在也不會流行起來的。”

According to Streamlined Life Cycle Assessment (LCA), Zeroplast free shows a significantly better environmental performance per kilogram than commonly available plastic materials in most impact categories examined. The material must be produced from renewable and mineral sources, be recyclable after use and decomposable in the event of improper disposal out of doors (littering), in order to avoid negative effects such as toxic substances or micro plastics. At its facility in Poland, Zeroplast develops and manufactures sustainable packaging solutions and compounds.

根據修正版生命週期研究法，在大部分有影響力的領域中每千克 Zeroplast free 材料的環保性能明顯好於普通的塑膠材料。

該材料在使用後將被回收利用，在被不恰當處理（亂丟廢物）後能夠在自然界自行降解，最終有效降低如有毒物或塑料微粒之類的負面影響。



Fig. 1: EcoPower 240/1100H/130L COMBIMOULD
圖 1: EcoPower 240/1100H/130L Combimould 多色多成分注塑機



Fig. 2: Jars and lids made of the natural material Zeroplast free, manufactured with a WITTMANN BATTENFELD *EcoPower* 240/1100H/130L COMBIMOULD, bearing an in-mold label consisting of certified cradle-to-cradle natural paper (Photo: Ernst Kainerstorfer)

圖 2：由 zeroplast free 材料製成的天然罐子和蓋子，採用 WITTMANN BATTENFELD *EcoPower* 240 / 1100H / 130L COMBIMOULD 製造，並帶有模內貼標，該貼標由搖籃到搖籃認證的天然紙組成（照片來源：Ernst Kainerstorfer）



The WITTMANN Group

The WITTMANN Group is a worldwide leader in the production of injection molding machines, robots and peripheral equipment for the plastics processing industry, headquartered in Vienna/Austria and consisting of two main divisions: WITTMANN BATTENFELD and WITTMANN. They jointly operate the companies of the group with eight production plants in five countries, and its additional sales and service companies are active with 34 facilities on all important plastics markets around the world.

WITTMANN BATTENFELD pursues the further expansion of its market position as an injection molding machine manufacturer and specialist for state-of-the-art process technologies. As a supplier of comprehensive, modern machine technology in modular design, the company meets both present and future market demands for plastics injection molding equipment.

The WITTMANN product portfolio includes robots and automation systems, material handling systems, dryers, gravimetric and volumetric blenders, granulators, temperature controllers and chillers. With this diversified range of peripheral units, WITTMANN offers plastics processors solutions to cover all production requirements, ranging from independent production cells to integrated plant-wide systems.

The syndication of the various segments under the umbrella of the WITTMANN Group has led to complete connectivity between the various product lines, for the benefit of plastics processors with an increasing demand for seamless integration of processing machinery with automation and peripherals.

威猛集團

威猛集團是塑料行業中製造射出機、機械手和周邊設備的全球領航者。威猛集團總部設在維也納/奧地利，由兩個主要部門，威猛巴頓和威猛組成，他們共同經營集團旗下分公司，在全球 5 個國家設有 8 個生產工廠，其中超過 34 個直屬子公司位於世界各大塑料市場，並各自負責該區域的銷售及售後服務。

威猛巴頓致力於製造最先進的射出機和工藝技術的獨立市場增長，提供現代化和全面的機械模組化設計，滿足塑料射出成型的實際和未來要求。

威猛的產品系列包括機械手和自動化系統，中央供料系統，除濕乾燥機，秤重式和體積式的計量機，粉碎機，模具溫度控制器和冷卻器。憑藉這種全面的周邊設備，威猛可為塑料加工商提供涵蓋所有生產要求的解決方案，從自主工作單元到整個工廠範圍的系統。

威猛集團的結合已經使所有產品線連接為一體，提供塑料加工商在射出機、自動化和輔助設備的無縫接軌，為塑料加工廠帶來了益處，對加工機械與自動化和外圍設備的無縫集成日益增長。

更多信息可參訪我們的網站 www.wittmann-group.tw