

LEPILA & TESNILNE MASE

Proizvodnja v Sloveniji

*ADHESIVES & SEALANTS*

*Production in Slovenia*

LEPILA & TESNILNE MASE,  
Proizvodnja v Sloveniji

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ADHESIVES & SEALANTS,  
Production in Slovenia

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Kemijska industrija je eden glavnih stebrov gospodarstva in je ključna za zeleni prehod celotne družbe, saj razvija in dobavlja materiale in izdelke praktično vsem ostalim dejavnostim ter potrošnikom. Združenje kemijske industrije (ZKI) pri Gospodarski Zbornici Slovenije (GZS) je predstavnik ožje kemijske, farmacevtske, gumarske in plastično predelovalne industrije. Del te panoge so tudi proizvajalci lepil in tesnilnih mas, ki so pod okriljem ZKI povezani v Delovno skupino za lepila in tesnilne mase. Le-ta je kot združenje proizvajalcev že skoraj 25 let član evropskega združenja proizvajalcev lepil in tesnilnih mas FEICA, ki v letu 2022 praznuje 50-letnico delovanja.

S to publikacijo želimo izpostaviti pomen proizvodnje lepil in tesnilnih mas v slovenskem prostoru, ki se ga premalo zavedamo. Zagotavlja namreč tako tradicionalno uveljavljene kot tudi mnoge napredne rešitve spajanja različnih materialov in elementov, s čimer omogoča funkcionalnost nešteti nepogrešljivih izdelkov. Z lepili in tesnilnimi masami med drugim tudi bistveno zmanjšamo toplotne izgube v stavbah ali popravimo izdelke in s tem olajšamo ponovno rabo ter recikliranje in omenjeni zeleni prehod.

Poslovne odličnosti ter naprednosti te dejavnosti ni mogoče spregledati, na kar kaže dejstvo, da konkurira tudi v zahtevnem mednarodnem okolju in ima nenazadnje dolgo tradicijo. Za vse to ob tej priložnosti podjetjem v imenu Združenja kemijske industrije čestitava in želiva tako njim kot vsem deležnikom veliko uspehov in koristnega sodelovanja še naprej.



Darja Boštjančič  
direktorica ZKI



Marko Štrukelj  
TKK d.o.o.

Predsednik Delovne skupine za  
lepila in tesnilne mase pri ZKI


*The chemical industry is one of the main pillars of the economy and is key to the green transition of the entire society as it develops and supplies materials and products to practically all other industries and consumers. The Association of Chemical Industries of Slovenia (ACIS) at the Chamber of Commerce and Industry of Slovenia (CCIS) is a representative of the narrower chemical, pharmaceutical, rubber and plastic processing industries. This industry also includes the manufacturers of adhesives and sealants, which are organised within the Working Group for Adhesives and Sealants under the auspices of ACIS. As an association of manufacturers, it has been for almost 25 years a member of the Association of the European Adhesive and Sealant Industry FEICA, which celebrates its 50th anniversary in 2022.*

*With this publication, we want to highlight the importance of the production of adhesives and sealants in Slovenia, which is not sufficiently known. Namely, it provides both traditionally established as well as many advanced solutions for bonding different materials and elements, thereby enabling the functionality of countless indispensable products. With adhesives and sealants, among other things, we also significantly reduce heat loss in buildings or repair products, thereby facilitating reuse and recycling and the aforementioned green transition.*

*The business excellence and progress of this branche cannot be overlooked, as evidenced by the fact that it competes even in a demanding international environment and, last but not least, boasts a long-standing tradition. On this occasion, we congratulate the companies on behalf of the Association of Chemical Industries of Slovenia and wish them and all stakeholders much success and fruitful cooperation in the future.*



Darja Boštjančič  
Director of ACIS



Marko Štrukelj  
TKK d.o.o.

President of the Adhesives and  
Sealants Group at ACIS





Odlični proizvodi in prava medsebojna kemija!  
*Excellent products and good human chemistry!*



## RAZVOJ LEPIL SKOZI ČAS NA SLOVENSKEM OZEMLJU

Človek je »lepilo« poznal že v davni preteklosti. Takrat je uporabil smolo iz brezovega lubja, s katero je kamnito konico prilepil na puščico. Za izdelavo lepil so dolga tisočletja uporabljali naravne materiale, kot so kri, živalske beljakovine, ribe, drevesne smole, naravni kavčuk, mlečne beljakovine ipd. Kakšna pa je zgodovina razvoja lepil na Slovenskem?

Znano je, da je bilo slovensko ozemlje do konca prve svetovne vojne sestavni del Avstro-Ogrske monarhije. Tako je bil gospodarski in s tem tudi industrijski razvoj naših krajev močno odvisen od dokaj nehomogene matične države. Do sredine 19. stoletja, še pred prvo industrijsko revolucijo, kemijska industrija v Avstro-Ogrski monarhiji ni bila kaj prida razvita, čeprav so ponekod kot posledica združevanja razdrobljene rokodelske proizvodnje že nastajale večje proizvodne enote.

Na naših tleh se poleg steklarn ter mlinov za papir in smodnik med omembe vrednimi pojavijo tudi proizvajalci modre galice, mila in kleja. Klej (glutinsko lepilo) so pridobivali usnarji in strojarji kot stranski proizvod svoje glavne dejavnosti.

### Proizvodnja kleja na Slovenskem

Eden od prvih slovenskih podjetnikov, ki je začel kuhati in tudi izvažati klej, je bil celovski tovarnar Ivan Mihael pl. Herbert. Leta 1756 so mu podelili t. i. privilegij – posebno zaščito, ekskluzivno pravico za proizvodnjo kleja. V času trajanja privilegija ni nihče drug smel ustanoviti obrata z enako proizvodnjo. Kljub takim poskusom »industrializacije« se je proizvodnja kleja na obrtni ravni ohranila še globoko v drugi polovici 19. stoletja.

## THE DEVELOPMENT OF ADHESIVES IN SLOVENIAN TERRITORY OVER TIME

*Humans have known “adhesives” already in ancient times. At that time, they used birch bark resin to glue the stone tip to the arrow. Natural materials such as blood, proteins, fish, tree resins, natural rubber, milk proteins and the like have been used for the production of adhesives for thousands of years. What about the history of the development of adhesives in the Slovenian territory?*

*It is known that the Slovenian territory was an integral part of the Austro-Hungarian Empire until the end of the first World War. Thus, the economic and also consequently industrial development of our localities was strongly dependent on the rather inhomogeneous home country. By the mid-19th century, even before the first industrial revolution, the chemical industry in the Austro-Hungarian Empire was not well developed, although larger production units were already being created in some places as a result of the consolidation of fragmented handicraft production.*

*In addition to glass factories and paper and gunpowder mills, producers of blue vitriol, soap and glue are also among those that are worth mentioning on our territory. Leather producers and tanners obtained glue as a by-product of their main activity.*

### Glue Production in Slovenian Territory

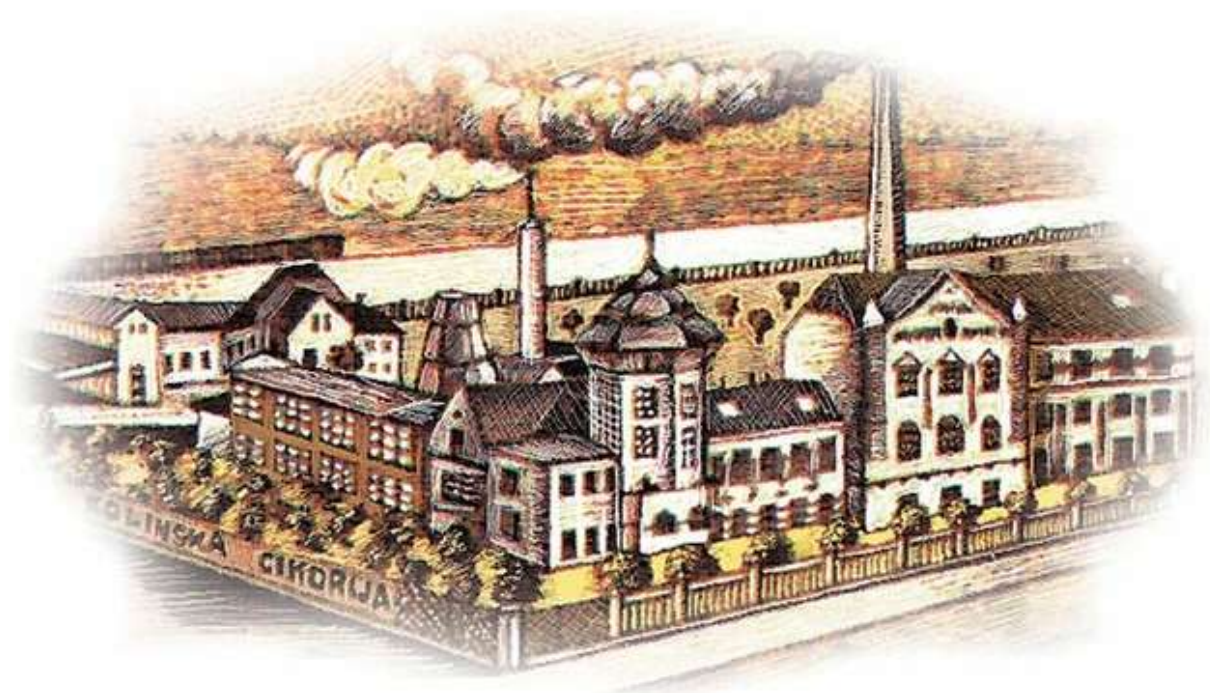
*One of the first Slovenian entrepreneurs who started cooking and also exporting glue was the Klagenfurt factory owner Ivan Mihael pl. Herbert. In 1756, he was granted the so-called privilege – special protection and exclusive right to produce glue. During the duration of the privilege, no one else was allowed to establish a plant with the same production. Despite such attempts at “industrialisation”, the production of glue at craft level continued well into the second half of the 19th century.*

Samostojni klejarski obrtniki iz Kamnika so letno proizvedli 30-35 ton kleja, kar je bila takrat precejšnja količina. Zaradi dobre kakovosti so ga večinoma izvažali v Italijo.

V okolici Ljubljane je bila leta 1882 ustanovljena Tovarna kleja, ki se je razvila v velikega proizvajalca kleja. Opremljena je bila tako, da je lahko prevzela v predelavo vse živilske odpadke, razglasili so jo za največjo tovarno te vrste ne samo v bivši Jugoslaviji, ampak celo na Balkanu.

*Independent glue craftsmen from Kamnik produced 30-35 tons of glue annually, which was a considerable amount at the time. Owing to its good quality, it was mostly exported to Italy.*

*In 1882, Tovarna kleja (Glue Factory) was founded in the vicinity of Ljubljana, which developed into a big glue producer. It was equipped in such a way that it could accept all food waste for processing. It was declared the largest factory of its kind, not only in the former Yugoslavia, but even in the Balkans.*



Slika bakroreza iz leta 1933 prikazuje  
Tovarno kleja.

*Picture of Copperplate from 1933  
– Glue Factory.*

Za zbiranje kosti so v tovarni organizirali posebno službo oziroma nakupovalno organizacijo, ki je pokrivala vso Jugoslavijo. Poleg kosti so v Tovarni kleja predelovali še odpadke usnjarn, rogove, odpadke kož in kri. Iz vseh teh manjvrednih odpadkov so izdelovali končne izdelke visoke vrednosti: vse vrste kleja, želatine, kostno mast, moko idr. Proizvodnja tovarne je presegala potrebe, nastale v Sloveniji in Jugoslaviji, zato so večji del izdelkov izvažali v Italijo, Francijo, Nemčijo in Anglijo, pa tudi v čezmorske dežele. Dobri kupci so bili v Severni Ameriki, Britanski in Nizozemski Indiji, na Kitajskem, v Egiptu, Palestini, Siriji in Južni Afriki.

*For the collection of bones, a special service or purchasing organization, covering all Yugoslavia, was organised in the factory. In addition to bones, the factory also processed tannery waste, horns, skin waste and blood. From all this inferior waste, high-value final products were produced: all kinds of glue, gelatine, bone marrow fat, flour and others. The production of the plant exceeded the needs incurred in Slovenia and Yugoslavia, hence most of the products were exported to Italy, France, Germany and England, but also overseas countries. Good buyers came from North America, the British and Dutch Indies, China, Egypt, Palestine, Syria and South Africa.*



Lenim vajencem so pogosto grozili, da bodo morali kuhati klej – vstati je bilo treba navsezgodaj, zakuriti peč in stalno mešati vodo s klejem v smradu lepila iz živalskih kosti in kož. Do 6. ure zjutraj je moralo biti lepilo že nared za bolj pridne delavce, da so lahko začeli z lepljenjem.

*Lazy apprentices were often threatened with having to cook the glue – it was necessary to get up early, light the stove and constantly mix water with glue amid the stench of the glue made from animal bones and skins. By 6 o'clock in the morning, the glue had to be ready for more diligent workers to be able to start gluing.*



Klej (glutinsko lepilo) uporabljajo še danes pri restavriranju dragocenega starega pohištva. Je zelo trden in elastičen, predvsem pa je trajen in ga je možno odstraniti ter ponovno nanesti.

*Glue (glutinous glue) is still used today in the restoration of old valuable furniture. It is very strong and elastic, but above all it is durable and can be removed and reapplied.*



## Razvoj industrije po letu 1945

Razvoj lepil je bil vse do 20. stoletja počasen. Izmed pomembnejših dosežkov industrijske panoge v povojnem obdobju v Sloveniji med leti 1945 in 1990 pa lahko izpostavimo:

- Začetek proizvodnje steklarskega kita leta 1958, kjer se je kot polnilo uporabljala domača kreda ter začetek proizvodnje tesnilnih mas leta 1977 v podjetju TTK Srpenica, kasneje še zagon proizvodnje poliuretanske pene, kar je podjetje umestilo v sam vrh svetovnih proizvajalcev.
- Tovarno Nafta iz Lendave, kjer so razvili metanolno kemijo - metanol, formalin in ureaformaldehidna lepila (za proizvodnjo ivernih in vlaknenih plošč) in umetne mase.
- Tovarno Iplas iz Kopra, predhodnik podjetja Kemiplas, kjer so s sodobno proizvodnjo anhidrida ftalne in maleinske kisline poleg mehčal, disperzij in predelave plastike proizvajali tudi lepila.
- Lepilo NEOSTIK, ki je bilo prvič izdelano daljnega leta 1960 in je kasneje postalo razpoznavni znak podjetja Kemostik.
- Podjetje Helios je slovelo predvsem po proizvodnji škrobnih in kazeinskih lepil. Uspešen prevzem Kemostika in stalna vlaganja v razvoj novih in ekološko prijaznejših tipov lepil so Helios Kemostik umestila med pomembne igralce na trgu lepil in tesnilnih mas srednje in vzhodne Evrope.
- Leta 1954 ustanovljeno podjetje Melamin iz Kočevja je postalo pomemben proizvajalec modificiranih melaminskih smol in filmov za oplemenitenje v srednji Evropi.
- Podjetje Mitol iz Sežane, ki že več kot 70 let ponuja visokokakovostne in inovativne rešitve na področju lepljenja.

## The Development of the Industry after 1945

*Up to the 20th century, the development of adhesives was slow. The following achievements can be highlighted in the post-war period in Slovenia between 1945 and 1990 as more important for the industry:*

- *The start of the production of glazing putty in 1958, where domestic chalk was used as a filler, and the start of the production of sealants in 1977 in the TTK Srpenica company, later also the launch of the production of polyurethane foam, which placed the company among the top global producers.*
- *The Nafta factory from Lendava, where they developed methanol chemistry - methanol, formalin and urea-formaldehyde adhesives (for the production of chipboard and fibre boards) and plastics.*
- *The Iplas factory from Koper, the predecessor of the Kemiplas company, where with the modern production of phthalic anhydride and maleic acid in addition to plasticizers, dispersions and plastic processing, they also established the production of adhesives.*
- *NEOSTIK adhesive, which was first produced way back in 1960 and later became the trademark of the company Kemostik.*
- *The Helios company was famous mainly for the production of starch and casein adhesives. The successful acquisition of Kemostik and continuous investments in the development of new and more eco-friendly types of adhesives have placed Helios Kemostik among important players on the market of adhesives and sealants in Central and Eastern Europe.*
- *Founded in 1954, Melamin has become an important producer of modified melamine resins and finishing films in Central Europe.*
- *Mitol, a company offering high quality and innovative solutions in gluing for more than 70 years.*



Zanimivo je, da se zgodba Mitola ni začela z lepili, to je bila namreč prej mlekarna. Začetki proizvodnje lepil segajo v zgodnja petdeseta leta 20. stoletja, ko je bilo na osnovi kazeina, pridobljenega iz mleka, izdelano prvo lepilo. Odločitev se je kmalu izkazala za vizionarsko, saj so bile zaradi hitrega industrijskega razvoja povojne Jugoslavije potrebe po industrijskih materialih in s tem tudi lepilih velike.

Povečano povpraševanje po industrijskih lepilih je botrovalo Mitolovi usmeritvi v novo tržno priložnost in poleg kazeinskih so začeli razvijati tudi sintetična lepila.

Leta 1962 je bil tako postavljen prvi reaktor za proizvodnjo disperzijskih lepil, šest let kasneje pa še lasten obrat za proizvodnjo disperzij. Leta 1975 so postavili linijo za izdelavo talilnih lepil in kot prvi v Jugoslaviji začeli s proizvodnjo nove generacije lepil.

*Interestingly, the Mitol story did not begin with adhesives, it used to be a dairy. The beginnings of adhesive production date back to the early 1950s when the first adhesive was produced based on the casein from milk.*

*The decision soon turned out to be a visionary as due to the rapid industrial development, the need for industrial materials and also adhesives in the post-war Yugoslavia was great.*

*The increased demand for industrial adhesives prompted Mitol's focus on the new market opportunity and next to casein adhesives, they also started developing synthetic adhesives.*

*In 1962, the first reactor for the production of dispersion adhesives was set up, followed six years later by its own plant for the production of dispersions.*

*In 1975, they set up a line for the production of melt adhesives and were the first in Yugoslavia to start the production of a new generation of adhesives.*



## Novi izzivi po osamosvojitvi Slovenije leta 1991

Devetdeseta leta so z osamosvojitvijo Slovenije in izgubo jugoslovanskega trga postavila kemijsko industrijo pred nove izzive, ki jih je uspešno reševala z reorganizacijo poslovanja in prodorom na tuje trge.

Ob prelomu tisočletja se je takratni direktor Mitola, g. Marjan Mateta, zavedal pomembnosti mednarodnega branžnega povezovanja industrije v okviru evropskega združenja. FEICA, evropsko združenje proizvajalcev lepil in tesnilnih mas, je bil identificiran kot ustrezno združenje za vključitev slovenskih proizvajalcev lepil in tesnilnih mas.

G. Marjan Mateta, dolgoletni direktor priznanega slovenskega proizvajalca lepil Mitol in prvi predsednik Delovne skupine proizvajalcev lepil in tesnilnih mas Slovenije, se spominja, kako se je leta 1998 začelo sodelovanje s FEICA.



## New Challenges following Slovenia's Independence in 1991

*With Slovenia's independence and the loss of the Yugoslav market, the 1990s presented the chemical industry with new challenges, which it addressed successfully by reorganising its operations and penetrating foreign markets.*

*Among the progressive Slovenian managers at the turn of the millennium, Mr Marjan Mateta, the then director of Mitol, was aware of the importance of international cooperation and the benefits of membership in a larger European association.*

*Mr Marjan Mateta, the then director of a renowned Slovenian adhesive producer Mitol and the first president of the Association of Adhesives and Sealants of Slovenia (AASS) remembers how cooperation with FEICA started in 1998.*

Fotografija / Photo: Marcel Kump, VSŠ Sežana







"Predstavnika podjetja Mitol sva se udeležila letne konference FEICA v Kölnu in že tedaj izrazila interes za sodelovanje s FEICA. Po ustanovitvi slovenske Delovne skupine za lepila in tesnilne mase (v okviru ZKI) je bila slednja leta 1999 na konferenci FEICA v Luzernu sprejeta v članstvo FEICA kot prvo združenje iz držav srednje in vzhodne Evrope, ki tedaj še niso bile članice EU. Leta 2004 je Slovenija v Ljubljani že gostila konferenco FEICA in EXPO."

Dolgoletno sodelovanje Delovne skupine za lepila in tesnilne mase s FEICA poteka predvsem na področju situacij in perspektiv, povezanih s surovinami, tehnološkim razvojem, zakonodajnih vprašanj in priprave standardov kakovosti. V današnjem izredno dinamičnem obdobju nenehnih sprememb in pritiskov so za podjetja-proizvajalce povezave z mrežo FEICA izjemno dragocene. Slovenija nima veliko proizvajalcev lepil in tesnilnih mas, vsi pa se ponajbolj z dolgoletno tradicijo in vlagajo veliko sredstev v nenehno izboljševanje zmogljivosti, nove tehnologije ter varovanje zdravja in okolja. Predstavljajo pomemben del slovenskega in tudi evropskega gospodarstva.

## Pot v prihodnost prek razvoja & inovativnosti

Zaključimo z dejstvom, da so podjetja v Sloveniji, ki so skozi desetletja gojila kulturo razvojne dejavnosti, inovativnosti in konkurenčnosti, ohranila svojo proizvodnjo z lastnimi razvojnimi ekipami, čeprav so nekatera prišla v tuje lastništvo. Pomembno je, da poleg proizvodnje v Sloveniji ostaja tudi razvoj. Lep primer sta podjetji TKK Srpenica in Mitol, ki se močno razvijata pod okriljem Soudal-a. Manj prodorna podjetja pa so opustila oz. zaprla svojo dejavnost, prav Kemiplas je bil eden od takih. Brezkompromisni globalni trg prav preko zgodovine kaže, da uspejo in obstanejo le najboljše.

Viri:

- Štefan Trajbarič GZS ZKI: Prispevek k zgodovini kemijske proizvodnje na Slovenskem
- Leban, Jelovčan: Lepila in lepljenje
- Darinka Kladnik: Šmartinka

*"2 representatives of the Mitol company attended the annual FEICA conference in Cologne and already then expressed our interest in cooperation with FEICA. Following the establishment of the Slovenian Working Group for Adhesives and Sealants (within ACIS), the latter was admitted to FEICA membership at the conference in Lucerne 1999 as the first association from the countries of Central and Eastern Europe, which were not yet EU members at the time. In 2004, Slovenia hosted the FEICA conference and EXPO in Ljubljana."*

*The long-standing cooperation with FEICA took place mainly in the field of market research, situations and perspectives linked to raw materials, technology development, legislative issues and the preparation of quality standards. In today's extremely dynamic era of constant change and pressure, contacts with other companies from the FEICA family and close cooperation with the FEICA team are extremely valuable. Slovenia does not have many manufactures of adhesives and sealants, but all of them boast a long tradition and invest a lot of resources in the continuous improvement of capacity, new technologies and protection of health and the environment. They represent an important part of the Slovenian and also European economy.*

## Way to the Future through Development & Innovation

*We can conclude by saying that companies that have cultivated a culture of development activity, innovation and competitiveness over decades have maintained their production with their own development teams, even though they passed into foreign ownership. It is important for us that, in addition to production, development also stays in Slovenia. Good examples are the TKK Srpenica and Mitol companies which are developing significantly under the auspices of Soudal. Less penetrating companies abandoned or closed its activity, Kemiplas was one of those. The uncompromising global market shows us right from history that only the best succeeds and survives.*

Sources:

- Štefan Trajbarič CCI ACIS: A Contribution to the History of Chemical Production in Slovenian Territory
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- Darinka Kladnik: Šmartinka



## POGLED V PRIHODNOST - VELIK POMEN LEPIL IN TESNILNIH MAS

### "Nadzorovana dolga življenjska doba" - povezovanje varnosti izdelkov in učinkovitosti ekološke bilance pri uporabi tehnologije lepljenega spoja

V prihodnosti bomo vse izdelke v vseh fazah življenjskega kroga obravnavali celostno, tako z vidika njihove varnosti kot tudi učinkovitosti v smislu krožnega gospodarstva oziroma okoljske bilance. Pri tem celostnem pristopu bo prihodnji razvoj z lepili spojenih izdelkov potekal v skladu z načelom nadzorovane dolge življenjske dobe.[1] To pomeni, da imamo nadzor nad celovitostjo lepljenih spojev v določenem predvidljivem obdobju uporabe v življenjskem krogu izdelka in ga lahko nato nadzorovano in ekološko usmerjeno odstranimo ob koncu življenjskega kroga izrabljenega izdelka.

Nadzorovana dolga življenjska doba tako združuje dva vidika: »varnost izdelkov« in »učinkovitost krožnega gospodarstva/ ekološke bilance«. Torej, v najdaljšem možnem obdobju uporabe v življenjskem krogu izdelka lepljeni spoji izpolnjujejo zakonsko določene varnostne zahteve.

Nato ob koncu življenjskega kroga izdelkov ti spoji omogočajo učinkovitost krožnega gospodarstva, kot je določeno v Okvirni direktivi EU o odpadkih.[2]

Poleg normativnega zagotavljanja, da je dejanska obremenitev lepljenega spoja v fazi uporabe v življenjskem krogu izdelka vedno manjša od njegove največje nosilnosti celostni pogled pomeni tudi to, da koncept konca življenjskega kroga z lepili spojenih izdelkov predstavlja sestavni del razvoja izdelkov že v fazi načrtovanja in oblikovanja. Novi izzivi, ki izhajajo iz konceptov varnosti izdelkov in krožnega gospodarstva, bodo zato v prihodnje

## LOOKING INTO THE FUTURE - GREAT IMPORTANCE OF ADHESIVES AND SEALANTS

### 'Controlled longevity' - linking product safety and eco-balance effectiveness when adhesive bonding technology is used

*In the future, all products will be considered holistically across all phases of their product life cycle, from both the perspective of their product safety and their circular economy or environmental balance effectiveness. For this holistic view, future developments of adhesively bonded products will take place in the sense of controlled longevity.[1] What is meant by this is that one has control over the integrity of the adhesively bonded joint over the specified, predictable period of the product life cycle phase 'utilisation' and can subsequently dispose of it in a controlled and ecologically targeted manner in the product cycle life phase 'end of life'.*

*Controlled longevity thus brings together the two aspects of 'product safety' and 'circular economy/eco-balance effectiveness'. So during the longest possible product life cycle phase 'utilisation', the adhesively bonded joints fulfil the legally required safety requirements.*

*Then in the product life cycle phase 'end of life', these joints enable the effectiveness of the circular economy as stipulated in the EU Waste Framework Directive.[2]*

*In addition to ensuring normatively that the real loading of an adhesively bonded joint in the product life cycle phase 'utilisation' is always less than its maximum loading capacity, the holistic view also includes making the 'end of life' concept of adhesively bonded products an integral part of product development as early as the product planning and design phase. The new challenges resulting from product safety and circular economy concepts therefore will require even more intensive communication and*

[1] B. Mayer, A. Groß (Ed.) In Circular economy and adhesive bonding technology - a study by Fraunhofer IFAM, Fraunhofer Verlag: Stuttgart, 2020, S. 211 –249, Adhesive bonding technology and its function as a partner for fulfilling requirements within the framework of 'circular economy' and 'eco-design'

[1] A. Groß, B. Mayer, K. Haag In Dichtungstechnik Jahrbuch 2022; K-F. Berger, S. Kiefer (Hrsg.); ISGATEC gmbH: Mannheim / Silber Druck oHG; Niestetal, 2022; S. 208 – 230, Im Spannungsfeld von Kreislaufwirtschaft und Ökobilanz



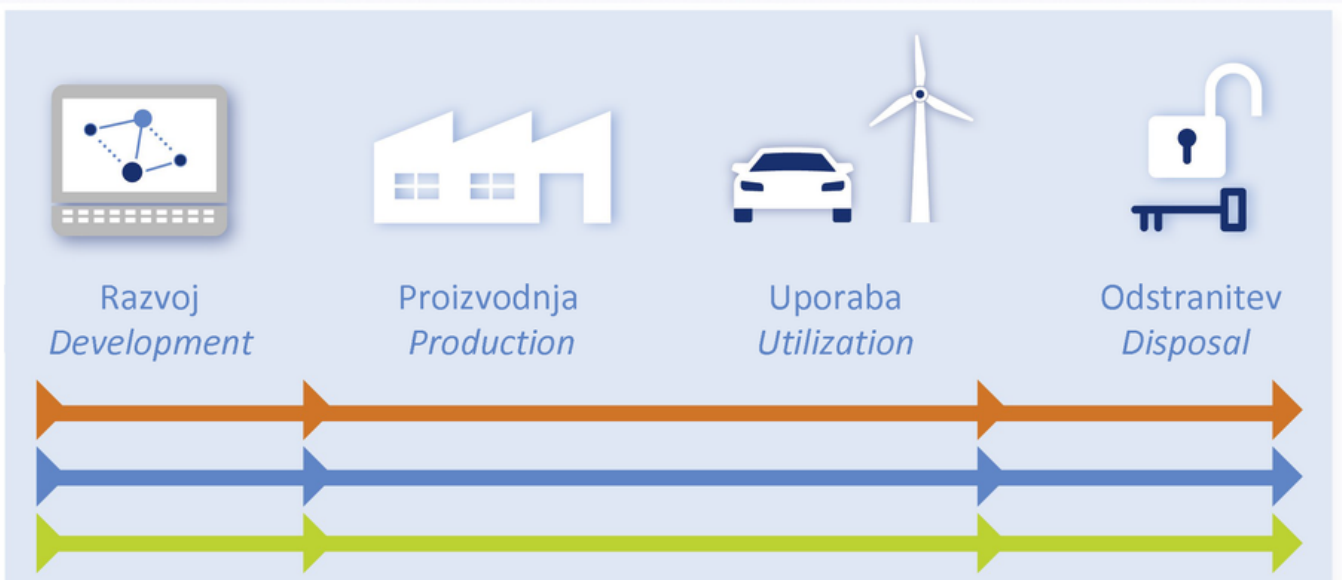
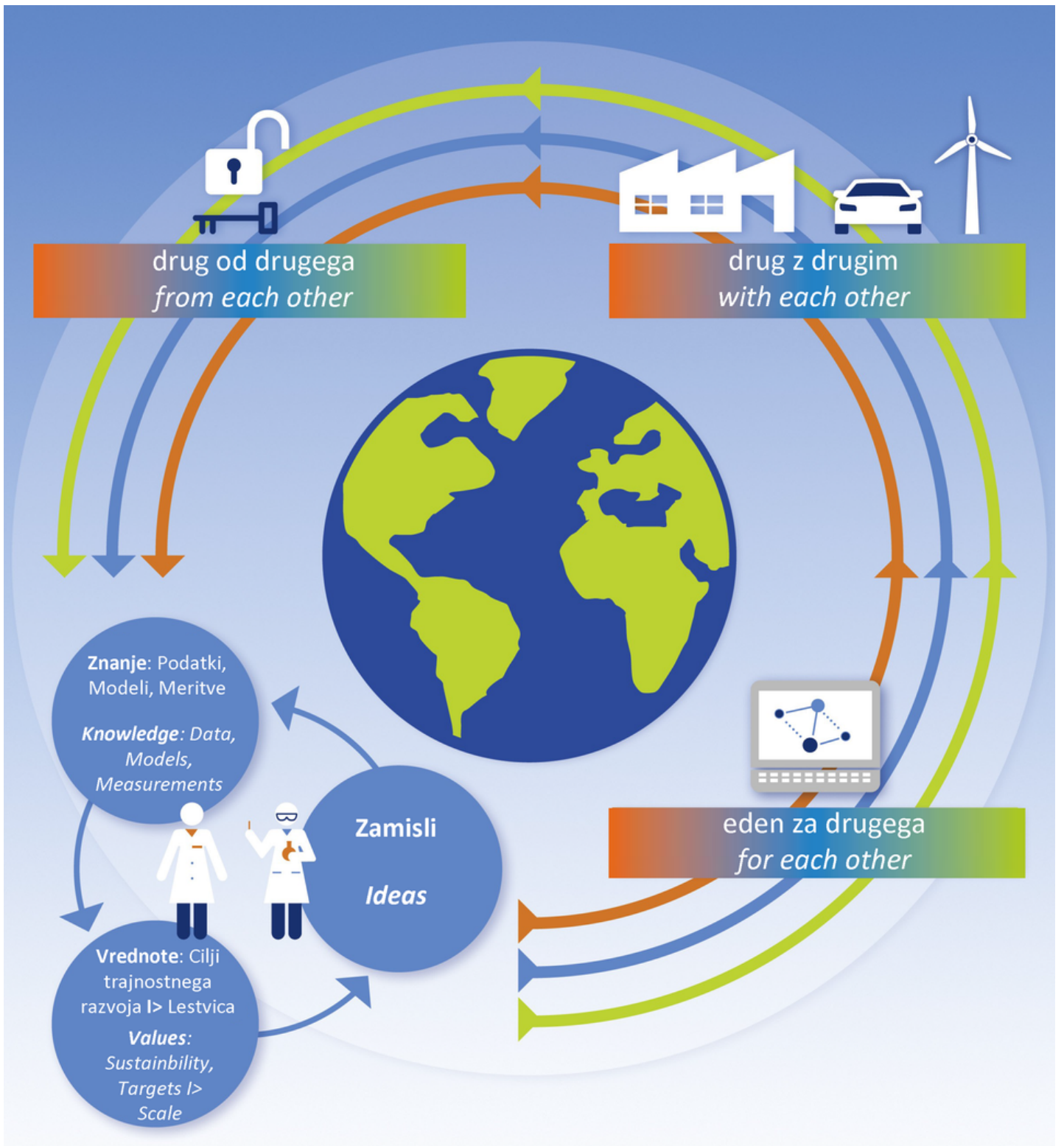
## Optimalna uporaba materialov in energije / *Optimising the use of materials and energy*

narekovali še intenzivnejšo komunikacijo in sodelovanje ter s tem tesnejše mreženje vseh akterjev vzdolž vrednostnih verig. Proizvajalci surovin, proizvajalci lepil in tesnilnih mas, formulatorji lepil in tesnilnih mas, uporabniki lepil in tesnilnih mas, proizvajalci izdelkov, končni potrošniki in predelovalci bodo skupaj oblikovali prihodnje cikle ustvarjanja vrednosti, ki bodo del »lepilno vezanega« sistema vzdolž življenjskega kroga teh izdelkov.

Celostno obravnavo z lepili spojenih izdelkov z vidika ekoloških izboljšav vzdolž vrednostnih verig oziroma ciklov omogoča analiza življenjskega kroga (LCA), ki trenutno predstavlja najbolj celovito metodo za ocenjevanje vplivov na okolje.

*cooperation in the future and thus even closer networking of all players along value chains. Raw material producers, adhesive and sealant manufacturers, adhesive and sealant formulators, adhesive and sealant users, product manufacturers, end customers and recyclers will jointly form future value creation cycles as part of the 'adhesively bonded' system along the life cycle of these products.*

*The holistic consideration of adhesively bonded products with regard to ecological improvements along value chains or cycles is made possible by the life cycle assessment (LCA) (se Chapter 4.3.10) as currently the most comprehensive assessment method for environmental impacts.*





## **Vsi ključni deležniki v življenjskem krogu uporabljajo informacije s ciljem celostnega oblikovanja, uporabe in izkoriščanja z lepili spojenih materialov.**

Tehnologija lepljenja in okoljsko primerna zasnova si posledično nista nasprotujoča, če sta celovitost izdelka in ločitev materiala povezana v smislu zgoraj opisane nadzorovane dolge življenjske dobe. Ločitev lepljenega spoja povzroči vsaj en zunanji sprožilec, ki se pri običajni uporabi spoja ne pojavi ter zato ne vpliva na zakonsko določeno in preverljivo varno uporabo izdelka. Ciljno ločevanje materialov po uporabi izdelka, ki je v krožnem gospodarstvu učinkovito, je predpogoj za recikliranje, razstavljanje in popravilo.

Z ekološkega vidika bi bilo treba uporabiti »model za okolje« (DfE), ki temelji na podatkovnih konceptih (FAIR), vključno z vzdrževanjem, popravilom ali prenovo. V tem primeru okoljski odtis izdelka (PEF) ponuja prednost vključitve podatkovnih nizov, zbranih v analizah življenjskega kroga in okoljskih deklaracijah izdelka (EPD-jih). Varnostne in tehnične liste lepil in tesnilnih mas je treba dopolniti z informacijami o koncu življenjskega kroga izdelka.

Pri ocenjevanju krožnosti z lepili spojenih izdelkov mora proizvajalec lepila kot svetovalec sodelovati že od začetka, vendar pa je odgovornost za odločitve na strani uporabnika lepila. V luči izzivov, ki jih sproža krožno gospodarstvo, je nujno zagotoviti intenzivno komunikacijo in tesno povezovanje vseh zgoraj omenjenih deležnikov v sistemu lepljenega spoja. K rešitvam usmerjena tehnološka fleksibilnost, pripravljenost na prilaganja in inovativnost so nedvomno na voljo in so se že v preteklosti izkazale s številnimi novimi zahtevami.

## **All key stakeholders in the life cycle use information for holistic design, application and utilisation of adhesively bonded materials.**

*Adhesive bonding technology and ecodesign are therefore not contradictory if product integrity and material separation are linked in terms of the controlled longevity described above. The detaching of an adhesively bonded joint is caused by at least one external trigger that does not occur in the normal use of the joint and therefore does not affect the legally required, verifiably safe use of the product. The targeted separation of materials after product use, which is effective of the circular economy, is a prerequisite for recycling, dismantling and repair.*

*From an ecological point of view, the 'Design for Environment' (DfE) based on FAIR data concepts including maintenance, repair or renovation should be used. Here, the PEF would offer the advantage of incorporating the data sets collected in the life cycle assessments and EPDs. Safety and technical data sheets of adhesives and sealants should be supplemented with information for the product life cycle phase 'end of life'.*

*When assessing the circularity of an adhesively bonded product, the adhesive manufacturer should be involved as an advisor from the beginning, but the responsibility of the decision lies with the adhesive user. With regard to the challenges initiated by the circular economy, intensive communication and close networking of all the above-mentioned stakeholders in the 'adhesive bonding system' are imperative. The solution-oriented technical flexibility, readiness to adapt and innovative ability are undoubtedly available and have already been demonstrated in the past with many new requirements.*

## Postopki razstavljanja z lepili spojenih izdelkov

Postopki razstavljanja z lepili spojenih izdelkov za namene predelave ali popravila surovin bodo osrednje točke razvojnega procesa in testiranja izdelkov v prihodnosti. V prihodnje bi morali zahteve za razstavljanje navesti v profilih zahtev pri zasnovi izdelka, ki so združljive s krožnim gospodarstvom in vplivajo na ekološko bilanco.

Sprožilce oziroma konstruktivne ukrepe za izboljšanje ekonomske učinkovitosti postopkov razstavljanja je treba upoštevati že v tej zgodnji fazi razvoja izdelka. Ob velikem številu različic, majhnih dimenzijah in velikih količinah je lahko demontaža (razrez), ki omogoča razvrščanje glede na vrsto materiala, različica postopka razstavljanja. Pri komponentah velikih dimenzij z veliko lastno težo razvrščenih komponent dajemo prednost uporabi mehanskega ločevanja lepljenih spojev. Dostopnost pripomočkov za razstavljanje je treba zagotoviti z zasnovo. Postopke, pri katerih je potrebno veliko sile, lahko mehaniziramo oziroma podpremo z avtomatskimi sistemi oziroma roboti. A v tem smislu je uporaba linij za razstavljanje, specifičnih za posamezne izdelke, večinoma nepreizkušena.

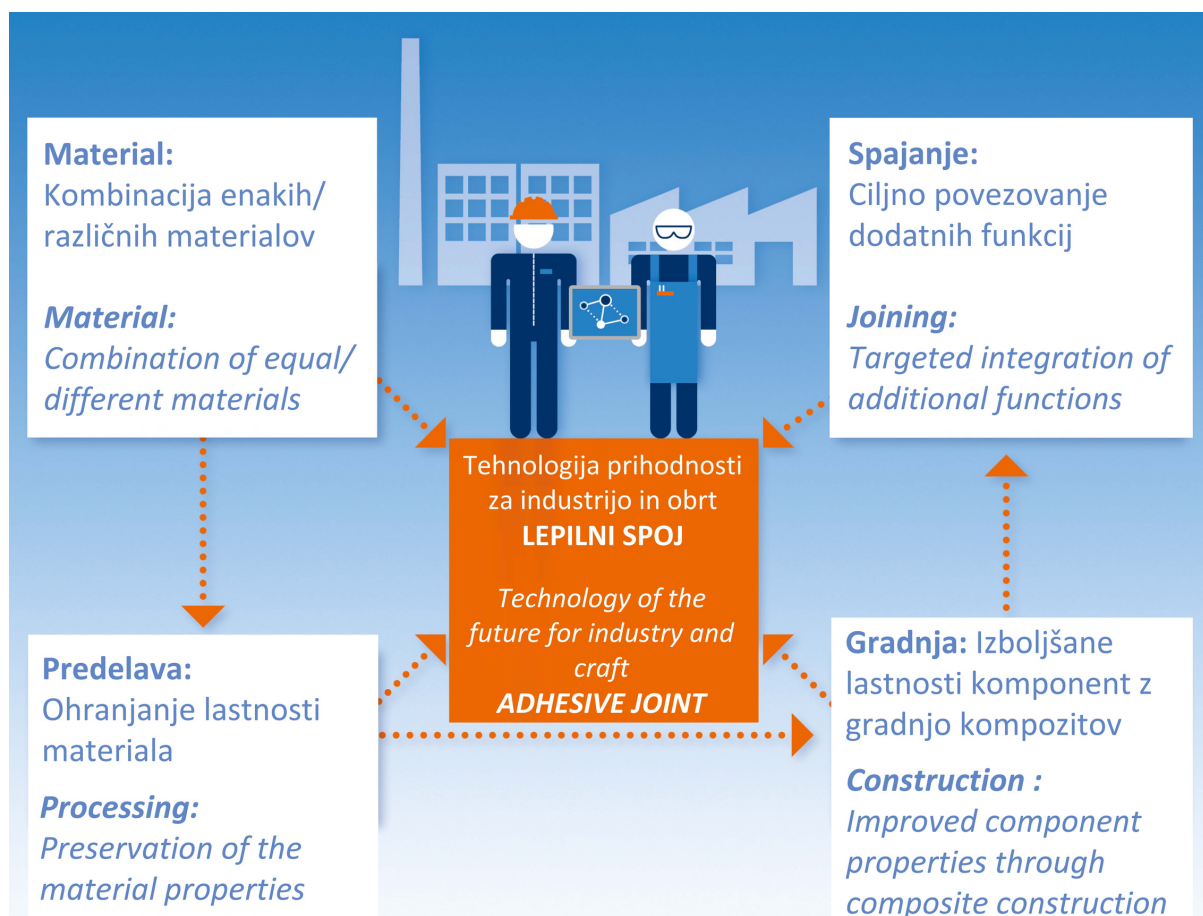
Ločevanje z dovajanjem toplote je način razstavljanja z lepili spojenih izdelkov, tako v kombinaciji z mehanskim ločevanjem kot samostojno. Razstavljanje z izpostavljenostjo je načeloma primerno za vodne, a zlasti za lepilne disperzije na osnovi škroba in se že uspešno uporablja v obrti (npr. odstranitev tapete) kot tudi pri izdelkih iz serijske proizvodnje (npr. odstranjevanje etiket s povratnih steklenic). Tehnologija lepljenja je že dolgo nepogrešljivo pomembna pri ekološki bilanci lahkih izdelkov iz več materialov. V prihodnosti bo tehnologija lepljenja prav tako ključna pri zagotavljanju popravila in recikliranja izdelkov. Zato lepilni spoj ne preprečuje razstavljanja tovrstnih izdelkov, temveč ponuja obetavno možnost za ločevanje spojenih delov.

## Disassembly processes of adhesively bonded products

*Disassembly processes of adhesively bonded products for raw material recovery or repair will be key focal points of the development process and product testing in the future. The requirements for disassembly should be listed in the future in requirement profiles for product designs that are compatible with the circular economy and have an impact on the ecological balance sheet.*

*Triggers or constructive measures to improve the economic efficiency of disassembly processes should already be considered in this early phase of product development. In the case of a high number of variants, small dimensions and high quantities, dismantling (shredding), which enables sorting by material type, can be a variant of the disassembly process. Components of large dimensions with a high dead weight of sorted components favour the use of mechanical detaching of adhesively bonded joints. Accessibility for disassembly aids must be ensured by design. Force-intensive processes can be mechanised or supported by automatic machines or robots. In this context, however, the use of product-specific disassembly lines is largely untested. Detaching by heat input is a means of dismantling adhesively bonded products, both in combination with mechanical detaching and independently.*

*Disassembly by media exposure is suitable in principle for aqueous, but especially for starch-based adhesive dispersions and is already being used successfully in handicraft (e.g. removal of wallpaper) as well as for mass-produced products (e.g. removal of labels from deposit bottles). Adhesive bonding technology has long been an indispensable factor relevant to eco-balance in the realisation of lightweight products through multi-material construction. In the future, adhesive bonding technology will also be a key to ensuring that products can be repaired and recycled. Accordingly, adhesive bonding does not prevent the disassembly of such products but offers a promising possibility for detaching the joined parts.*



Vir / Source: Fraunhofer IFAM

## Tehnologija lepljenja - tehnologija spajanja 21. stoletja

Nenehni izumi in inovacije akterjev s področja razvoja surovin, lepil in tesnilnih mas ter z lepili spojenih izdelkov so že v preteklih desetletjih prinesli dinamičen razvoj. Predvsem so razvili številne nove prebojne rešitve glede na nenehno naraščajoče regulativne zahteve za določene snovi (npr. iz skupine topil, mehčalcev, monomerov in biocidov).

Razvoj industrijskih lepil in tesnilnih mas ima preverljivo potencial, da se razvijejo in ponudijo tehnološko primerne rešitve znotraj danih zakonodajnih in ekoloških mejnih pogojev, s čimer se z ustreznimi rešitvami, specifičnimi za panogo, izpolnijo nove zahteve in na trg dajo optimizirani izdelki.

## Adhesive bonding technology - the joining technology of the 21st century

Continuous inventions and innovations by the players in the development of raw materials, adhesives and sealants, as well as adhesively bonded products, have already brought dynamic development in the past decades. In particular, numerous new groundbreaking solutions have been developed with regard to the constantly increasing regulatory requirements for certain substances (e.g. from the group of solvents, plasticisers, monomers and biocides).

Industrial adhesive and sealant development has verifiably the potential to develop and offer technically suitable solutions within given legislative and ecological boundary conditions, to meet these new requirements



Akterji, ki sodelujejo na področju raziskav in razvoja, industrije in uporabe lepil, so že večkrat dokazali sposobnost tehnologije lepljenega spoja za izdelavo varnih in ekološko neškodljivih lepljenih spojev.

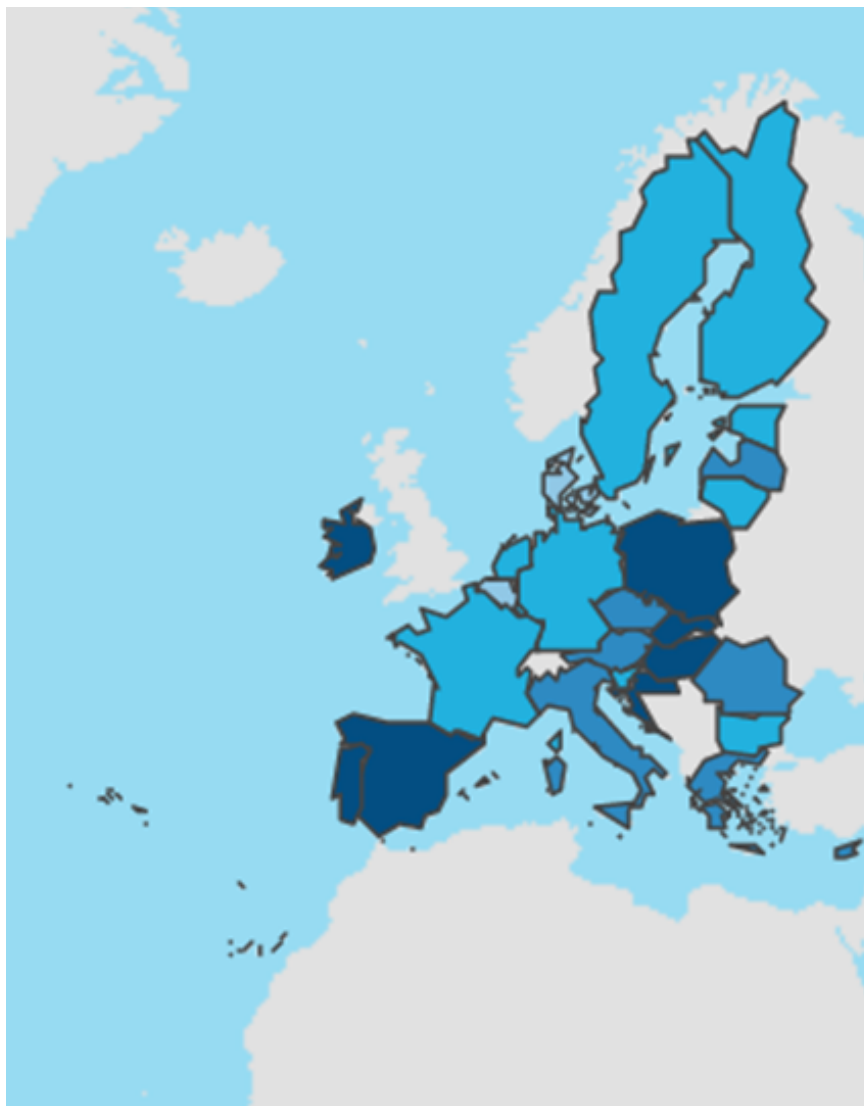
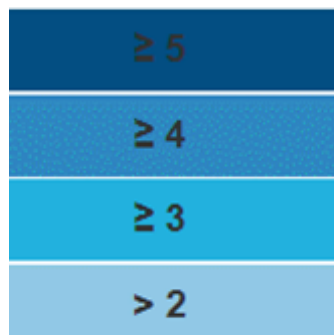
Pogled »od materiala do varnega izdelka« združuje vidike varnosti in dolgoročne stabilnosti z zahtevami krožnega gospodarstva v smislu trajnosti izdelka. Na tem področju nasprotij poseduje tehnologija lepljenja potrebno tehnološko in ekološko zmogljivost ter posledično potencial, da postane vodilna tehnologija spajanja 21. stoletja.

*with adequate industry-specific solutions and to arrive at optimised products. The ability of adhesive bonding technology to produce safe and ecologically sound adhesively bonded joints has already been demonstrated many times by the players involved in the fields of research and development, the adhesive industry and adhesive application.*

*The view 'from material to safe product' combines the aspects of safety and long-term stability with the requirements of a circular economy in the sense of product sustainability. In this area of conflict, adhesive bonding technology has the necessary technological and ecological performance capacity and thus offers the potential to become the leading joining technology of the 21st century.*

BDP rast 2022

GDP Growth 2022



**EVROPSKI TRG LEPIL  
IN TESNILNIH MAS**

***EUROPEAN ADHESIVES  
AND SEALANTS MARKET***







## Evropski trg lepil in tesnilnih mas - trendi

## European Adhesives and Sealants Market - Trends

### Lepila:

- 2020: 11,6 mlrd. € in 3,9 mil. ton.
- Napovedi rasti: 16,5 mlrd. € & 4,7 mil. do leta 2026, letna povprečna stopnja rasti pribl. 3,0 %.

### Adhesives:

- 2020: €11.6 billion and 3.9 million tonnes.
- set to grow to €16.5 billion & 4.7 million tonnes by 2026, at annual growth rate of approx. 3.0%.

### Tesnilne mase:

- 2020: 4,0 mld. € in 768.000 ton.
- Do leta 2026 naj bi trg zrasel na 5,7 mlrd. € in 962.400 ton, stopnja rasti 3,6 %.

### Sealants:

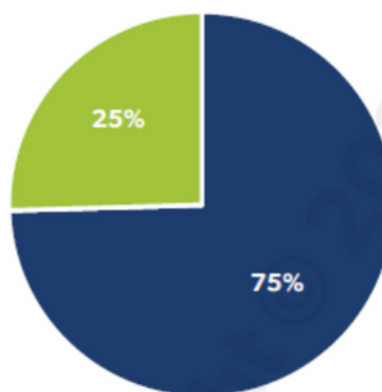
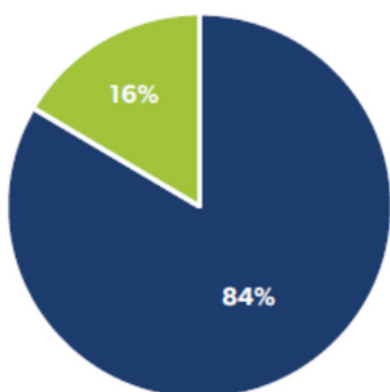
- 2020: €4.0 billion and 768,000 tonnes.
- By 2026 set to grow to €5.7 billion and 962,400 tonnes, at GR of 3.6%.

### Evropski trg lepil in tesnilnih mas v letu 2020, obseg in vrednost (,000 ton in v mil. €) European adhesives and sealants market in 2020 volume and value (,000 tonnes and € million)

Vir / Source: FEICA/Smithers

4,7 mil. ton      15,5 mlrd. €  
4,7 million tonnes      15,5 billion €

■ Lepila      ■ Tesnilne mase  
Adhesives      Sealants



- Izdelki na biološki osnovi še naprej rastejo; izdelki na podlagi fosilnih goriv še naprej padajo.
  - Veliko povpraševanje po varnih, recikliranih in trajnostnih lepilih in tesnilnih masah.
  - Splošni trend v panogi prispeva k učinkovitejšemu proizvodnemu procesu z manjšim odtisom CO2.
  - Nestabilni trg lepil in tesnilnih mas: vpliv Covida, stroški & razpoložljivost surovin (Sueški prekop, zaprtje azijskih pristanišč, neurje Uri v ZDA...), vojna v Ukrajini.
  - Največja rast na trgih transporta, gradbeništva, tehnologije in embalaže.
- *Bio-based continues to grow; fossil-based continues decline.*
  - *Strong demand for safe, recyclable, and sustainable adhesive and sealants products.*
  - *General trend of adhesive and sealants contributing to more efficient production process with lower CO2 footprint.*
  - *Volatile adhesive and sealants market: impact COVID, cost & availability raw mat (Suez canal, Asia ports closed, US storm Uri, ...), Ukraine war.*
  - *Strongest growth in transportation, construction, engineering, and packaging markets.*





**POROČILO O EVROPSKEM TRGU  
LEPIL IN TESNILNIH MAS  
2021-2026**

***EUROPEAN ADHESIVES AND  
SEALANTS MARKET REPORT  
2021-2026***

## POROČILO O EVROPSKEM TRGU LEPIL IN TESNILNIH MAS 2021- 2026

**Najhitrejša rast se napoveduje v tržnem segmentu montaža/drugo, čemur sledi transport in nato gradbeništvo/konstrukcije/nizke gradnje.**

### Regionalni trendi

- Trg lepil in tesnilnih mas v Zahodni Evropi v 2020 je znašal več kot 9,5 mlrd. € in blizu 3 mil. ton. Napoved za leto 2021 je skoraj 11,4 mlrd. € in blizu 3,1 mil. ton, kar se bo do leta 2026 povečalo na 12,9 mlrd. € in več kot 3,4 mil. ton. 5-letni CAGR tako znaša 2,6 % oziroma 2,3 %. Nemčija je največji trg pri povpraševanju po lepilih in tesnilnih masah v Zahodni Evropi ter predstavlja 29 % celotnega obsega povpraševanja v 2020, sledita ji Francija (16 %) in Velika Britanija (15 %).

## EUROPEAN ADHESIVES AND SELANTS MARKET REPORT 2021- 2026

**Fastest growth is forecast in the assembly/other market segment, followed by transportation and then by building/construction/civil engineering.**

### Regional trends

- The adhesives and sealants market in Western Europe in 2020 was over €9.5 billion and close to 3 million tonnes. Forecast for 2021 is at nearly €11.4 billion and close to 3.1 million tonnes growing to €12.9 billion and over 3.4 million tonnes by 2026. This represents a 5-year CAGR of 2.6% and 2.3% respectively. Germany is the largest market in A&S demand in Western Europe, making up for 29% of its total volume demand in 2020, followed by France (16%) and Great Britain (15%).

### Povpraševanje po lepilih in tesnilnih masah v Evropi (,000 ton & mil. €) Europe adhesives and sealants demand (,000 tonnes & € million)

Vir / Source: FEICA/Smithers

	2019	2020	2021	2026	CAGR (%) 2019-26
Lepila in tesnilne mase, povpraševanje (,000 ton) Adhesives & Sealants demand (,000 tonnes)	4896,4	4656,9	4880,1	5680,3	2,1
Lepila in tesnilne mase, povpraševanje (mil. €) Adhesives & Sealants demand (€ million)	16312,9	15531,7	18563,3	22202	4,5
Lepila, povpraševanje (,000 ton) Adhesives demand (,000 tonnes)	4083,3	3888,9	4073,6	4717,9	2,1
Lepila, povpraševanje (mil. €) Adhesives demand (€ million)	12145,8	11576,3	13878,3	16482	4,5
Tesnilne mase, povpraševanje (,000 ton) Sealants demand (,000 tonnes)	813,1	768	806,4	962,4	2,4
Tesnilne mase, povpraševanje (mil. €) Sealants demand (€ million)	4167,2	3955,4	4685	5720	4,6



- Srednja in Vzhodna Evropa (CEE) naj bi po napovedih do 2026 rasla hitreje kot Zahodna Evropa: Celotni trg v 2020 je znašal 6 mlrd. € in več kot 1,7 mil. ton, z napovedjo 7,2 € mlrd. in 1,8 mil. ton v 2021. Do leta 2026 naj bi trg Srednje in Vzhodne Evrope dosegel okrog 9,3 mlrd. € in več kot 2,2 mil. ton, pri čemer bo 5-letna CAGR 5,2 % oziroma 4,3 %. Rusija je največji trg pri povpraševanju po lepilih in tesnilnih masah v CEE, predstavlja 30 % celotnega obsega povpraševanja v 2020, sledi ji Turčija s 23 %. Razsežne posledice ruske invazije na Ukrajino bodo to situacijo gotovo spremenile.
- Nadaljevanje selitve proizvodnje lepil in tesnilnih mas iz zahodne v vzhodno Evropo, ko gre za nizko in srednjo tehnologijo, kot je PU in tehnologija na osnovi topil. Visoko-tehnološka proizvodnja na vodni osnovi, vroče lepljenje in proizvodnja silikona zaenkrat ostajajo pretežno v Zahodni Evropi.
- *Central & Eastern Europe (CEE) is forecast to have faster growth up to 2026 than Western Europe: The total market in 2020 was €6 billion and over 1.7 million tonnes and for 2021 forecast at €7.2 billion and 1.8 million tonnes. By 2026 the Central & Eastern European market will have reached around €9.3 billion and over 2.2 million tonnes, at a 5-year CAGR of 5.2% and 4.3% respectively. Russia is the largest market in A&S demand in CEE, making up for 30% of its total volume demand in 2020, followed by Turkey with 23%. The far-reaching consequences of the Russian invasion of Ukrainewill certainly change this situation.*
- *Continued move of adhesives and sealants production from Western to Eastern Europe for low/mid-tech applications such as PU and solvent-based. High-tech water-based, hot-melt and silicone production stays predominantly in Western Europe for now.*

## **Povpraševanje po LEPILIH in TESNILIH MASAH v Evropi glede na tržni segment - številke in dejstva**

### **Dejavnosti montaže:**

- Največja napovedana rast povpraševanja po lepilih in tesnilnih masah.
- Trend avtomatizacije/digitalizacije v operativnih postopkih.
- Povečanje najema namesto lastništva elektronskih naprav/elektronike zaradi trajnostnih ciljev.
- Povečano povpraševanje po lepilih zaradi trenda v smeri majhne teže, preureditve senzorjev in elektronike/čipov.
- Nadaljnja rast proizvodnje montažnih modulov za gradbeništvo/konstrukcije in sektorja obnovljive energije prav tako prispeva k vse večjemu povpraševanju po lepilih.

### **Transport:**

- Zlom od izbruha Covid-19, a je znova pridobil na obsegu v 2021.
- Letalska in vesoljska industrija naj pred 2023 ne bi dosegla ravni pred krizo.

## **Europe ADHESIVES and SEALANTS demand by market segment - figures & facts**

### **Assembly:**

- *Strongest adhesives and sealants demand growth forecast.*
- *Automation/digitalisation trend in operational processes.*
- *Increase in leasing instead of owning of electrical appliances/electronics bcs of sustainability objectives.*
- *Increase adhesives demand bcs of the trend towards light weighting, retrofitting sensors and electronics/chips.*
- *Continued growth of manufacturing of prefab modules for building/construction and renewable energy sector also drives an increasing adhesives demand.*

### **Transportation:**

- *Collapsed since outbreak of COVID-19 but has gained adhesives and sealants volumes again in 2021.*
- *Aerospace is not expected to reach pre-crisis levels before 2023.*

- Dobri obeti za rast povpraševanja po lepilih in tesnilnih masah z naraščajočim povpraševanjem po lahkih vozilih z nizkimi emisijami ogljika.

### Gradbeništvo/konstrukcije/nizke gradnje/obrt:

- Vse večje povpraševanje po (bolj) okolju prijaznih materialih.
- Vse večji poudarek na energetski učinkovitosti, proizvodnji trajnostne energije in obnovi.

- *Good adhesives and sealants demand growth prospects with increasing demand for lightweight and low-carbon-emitting vehicles.*

### Building/construction/civil engineering/craftsmen:

- *Growing demand for (more) eco-responsible materials.*
- *Increasing focus on energy efficiency, sustainably energy generation, and renovation.*

**Povpraševanje po lepilih in tesnilnih masah v Evropi glede na tržni segment (,000 ton & mil. €)**  
*Europe adhesives and sealants demand by market segment (,000 tonnes & € million)*

Vir / Source: FEICA/Smithers



**Potrošnik/sam svoj mojster:**

- Povpraševanje naj bi se po obsegu in vrednosti povečalo za okoli 3 % v naslednjih petih letih.
- Povečano povpraševanje v segmentu potrošnik/sam svoj mojster v času zaprtja se je izravnalo z občutnim pomanjkanjem povpraševanja s strani B2B, saj so bile številne pisarne in ustanove v daljšem časovnem obdobju zaprte.

**Papir/karton & sorodni izdelki:**

- Majhno povečanje v 2020 in nadaljevanje rasti v 2021.
- Zaradi povečanja e-trgovine, povečanja posamezne embalaže, povpraševanja po embalaži za živila, higiensko/sanitarnih proizvodih in embalaži za farmacevtske proizvode.
- Trenutni trajnostni trendi zmanjševanja odpadne embalaže, spodbujanja ponovne uporabe embalaže, manjše teže in recikliranja embalaže.

**Obutev/usnje:**

- Občuten upad na skoraj -24% v 2020 vs. 2019 zaradi zaprtja, manjša poraba za luksuzno blago.
- Počasno okrevanje v 2021, vendar še ne nazaj na obseg pred covid-19.

**Consumer/DIY:**

- *Demand is forecast to grow by around 3% in volume and value in the next five years.*
- *Increase of demand by consumer DIY during lockdowns was off-set by a significant decline in demand by B2B with many offices and institutions closed during extended periods of time.*

**Paper/board& related products:**

- *Small increase in 2020 and continued growth in 2021.*
- *Driven by a surge in e-commerce, growth individual packaging, demand in food packaging, hygiene/sanitary products and pharmaceutical packaging.*
- *Current sustainability trends of reducing packaging waste, encouraging the reuse of packaging, light weighting and recycling of packaging.*

**Footwear/leather:**

- *Declined significantly at close to -24% in 2020 vs. 2019 bcs of lockdown, less spending on luxury goods.*
- *Slowly recovering in 2021 but not back at pre-COVID-19 volumes yet.*



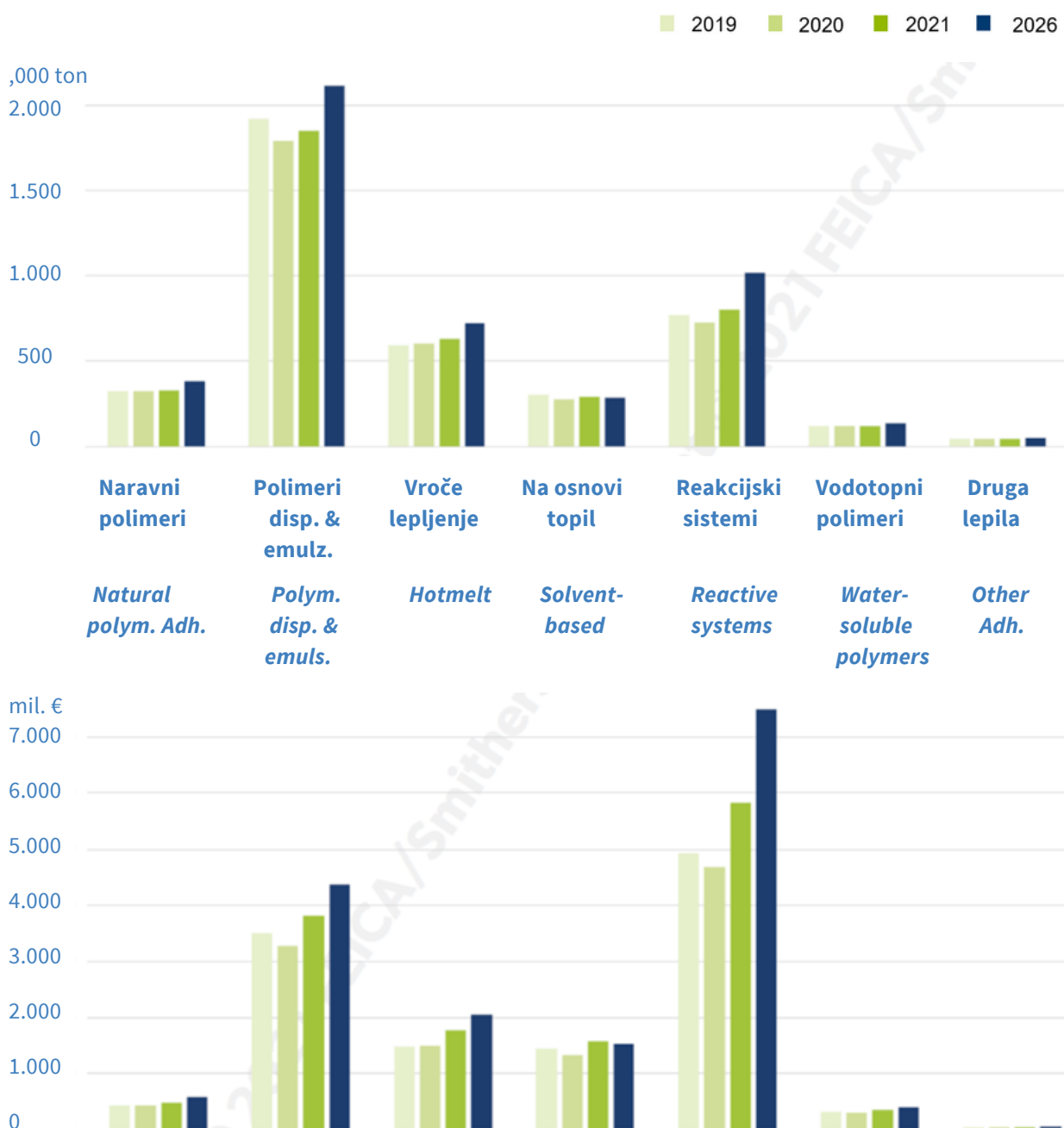


## Povpraševanje po LEPILIH v Evropi po kategoriji proizvoda

## European ADHESIVES demand by product category

Povpraševanje po LEPILIH v Evropi po kategoriji proizvoda (,000 ton & mil. €)  
European ADHESIVES demand by product category (,000 tonnes & € million)

Vir / Source: FEICA/Smithers



**Reakcijski (polimerizirani sistemi):**

- Velika rast v preteklosti, po napovedih bo predstavljala vodilno kategorijo v naslednjih 5 letih s skoraj 5 % CAGR\* po obsegu.

**Polimerne disperzije:**

- Napovedana rast za skoraj 3 % CAGR po obsegu in vrednosti v naslednjih 5 letih.

**Na osnovi topil:**

- Nadaljevanje upada.

**Vroče lepljenje:**

- Napoved nadaljnje rasti za skoraj 3 % CAGR po obsegu in vrednosti v naslednjih 5 letih.

**Lepila na vodni osnovi:**

- Predvidena rast za več kot 2 % CAGR po obsegu in vrednosti v naslednjih 5 letih.

**Naravni polimeri:**

- Napovedana rast za več kot 3 % CAGR po obsegu in vrednosti v naslednjih 5 letih.

(\*CAGR : skupna letna stopnja rasti)

**Reactive (polymerized systems):**

- *Strong growth in past, forecasted to be leading category in next 5Y of close to 5% CAGR\* by volume.*

**Polymer dispersions:**

- *forecast to grow by close to 3% both in CAGR volume and value in the next 5Y.*

**Solvent-based:**

- *Continue decline.*

**Hotmelts:**

- *Forecast to continue to grow by close to 3% both in CAGR volume and value in next 5Y.*

**Water-based adhesives:**

- *Projected to grow by over 2% in CAGR volume and value in the next 5Y.*

**Natural polymers:**

- *Forecast to grow by over 3% both in CAGR volume and value in the next 5Y.*

(\*CAGR : compound annual growth rate)

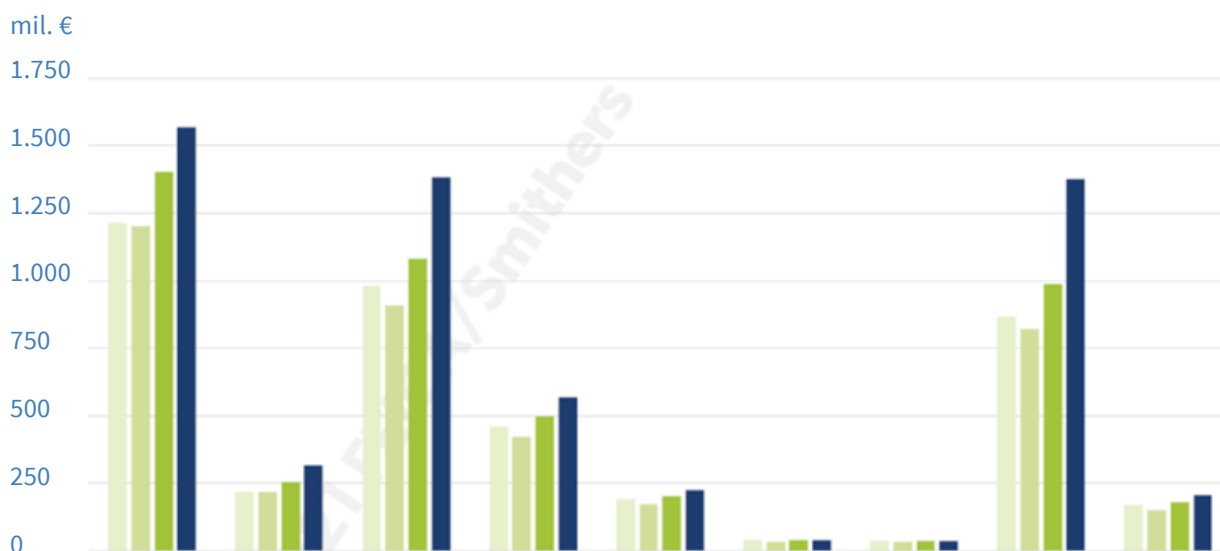
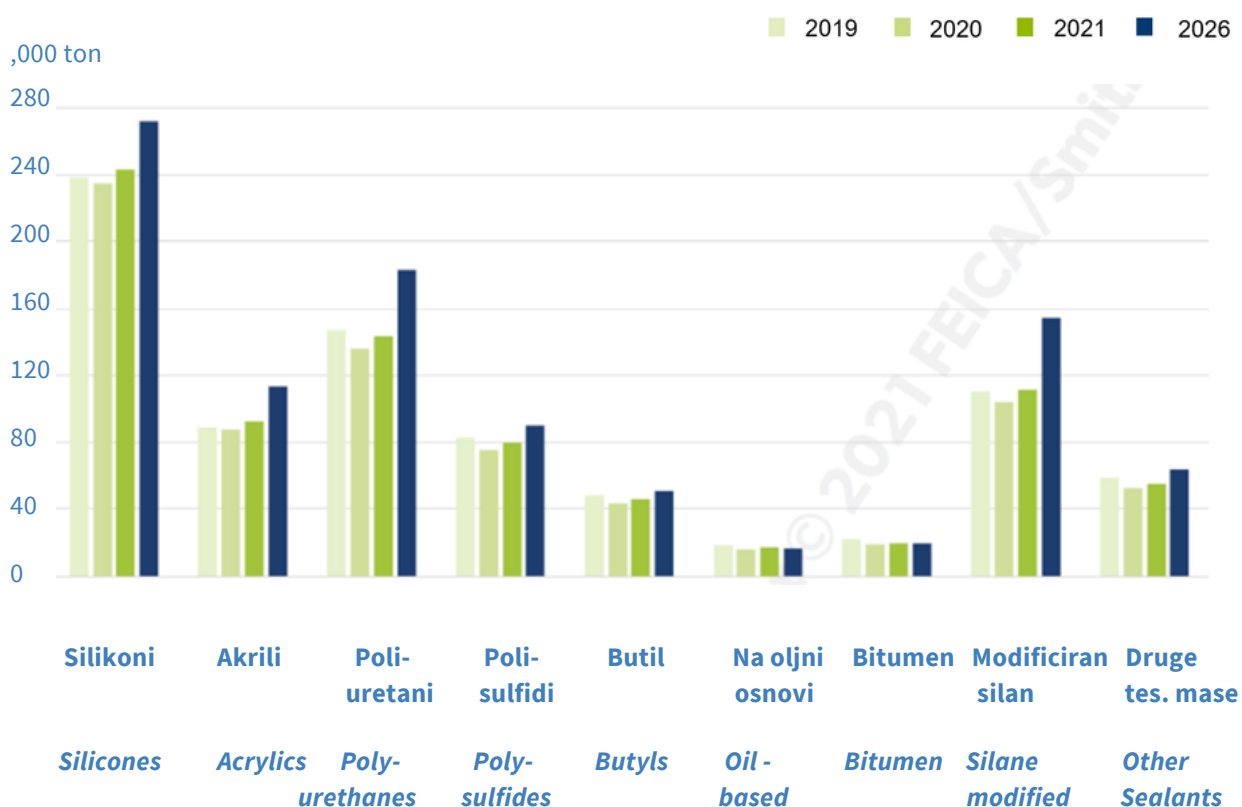


## Povpraševanje po TESNILNIH MASAH v Evropi po kategoriji proizvoda

## European SEALANTS demand by product category

Povpraševanje po TESNILNIH MASAH v Evropi po kategoriji proizvoda (,000 ton & mil. €)  
European SEALANTS demand by product category (,000 tonnes & € million)

Vir / Source: FEICA/Smithers





**Skoraj tretjino (30%) obsega evropskih tesnilnih mas v 2020 so predstavljali silikoni, sledili so jim poliuretani z 18% in polimeri modificiranega silana (PMS) s 14%.**

**Silikoni:**

- Predvidena rast za več kot 2 % CAGR po obsegu in vrednosti v naslednjih 5 letih.

**Poliuretani:**

- Napovedana rast v višini 5 % CAGR po obsegu in vrednosti v naslednjih 5 letih.

**Polisulfidi:**

- Napovedana rast za skoraj 3 % CAGR po obsegu in vrednosti v naslednjih 5 letih.

**Polimeri modificiranega silana (PMS):**

- Napovedana rast za skoraj 7 % CAGR po obsegu in vrednosti v naslednjih 5 letih

**Akrili:**

- Napovedana rast za več kot 4 % CAGR po obsegu in vrednosti v naslednjih 5 letih.

**Butil, bitumen, na oljni osnovi:**

- Napovedana rast za več kot 2 % CAGR po obsegu in vrednosti v naslednjih 5 letih.

*Nearly a third (30%) of the European sealants volume demand in 2020 was made up by silicones, followed by polyurethanes with 18% and silane modified polymers (SMP) with 14%.*

**Silicones:**

- Forecast to grow by over 2% both in CAGR volume and value in the next 5Y.

**Polyurethanes:**

- Forecast to grow by 5% both in CAGR volume and value in the next 5Y.

**Polysulfides:**

- Forecast to grow by close to 3% both in CAGR volume and value in the next 5Y.

**Silane-modified polymers (SMPs):**

- Forecast to grow by close to 7% both in CAGR volume and value in the next 5Y.

**Acrylics:**

- Forecast to grow by over 4% both in CAGR volume and value in the next 5Y.

**Butyls, bitumen, oil-based:**

- Forecast to grow by over 2% both in CAGR volume and value in the next 5Y.



# **PROIZVAJALCI LEPIL IN TESNILNIH MAS V SLOVENIJI**

**Vpisi nekaterih proizvajalcev lepil in tesnilnih mas v Sloveniji so v tej publikaciji navedeni primeroma.**

**S ciljem, da v naslednjem koraku nastane bolj celovit katalog, vabimo vsa ostala podjetja s to dejavnostjo in tudi relevantne deležnike, da se nam za vpis v katalog javite po e-pošti na [zki@gzs.si](mailto:zki@gzs.si) ali tel.: 01/5898 257.**

## **ADHESIVES AND SEALANTS MANUFACTURERS IN SLOVENIA**

*Entries of some manufacturers of adhesives and sealants in Slovenia are given as examples in this publication.*

*With the goal of creating a more comprehensive catalogue in the next step, we invite all other companies with this activity and also relevant stakeholders to contact us by e-mail at [zki@gzs.si](mailto:zki@gzs.si) or phone: +386 1/5898 257 for inclusion in the catalogue.*



# EUROSOL d.o.o.

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Z več kot 25 letnimi izkušnjami na področju aerosolov, tehničnih pršil, lepil in poliuretanskih pen se vam predstavlja, družbeno in okoljsko odgovorno podjetje Eurosol d.o.o. Jesenice.

Ustanovljeno je bilo leta 1997 za razvoj, proizvodnjo in trženje poliuretanske pene, lepil in tehničnih pršil. Podjetje se nahaja na Jesenicah in danes šteje 60 zaposlenih ter se ponša z lastnim razvojem in s tehnološko atraktivnimi izdelki.

Posebna prednost podjetja je velika fleksibilnost pri izdelavi in dobavi naročenih produktov.

Zaradi vse večjega asortimana izdelkov in posledično širjenja kolektiva podjetje konstantno povečuje svoje poslovne prostore in skladišča.

Proizvodnji izdelkov je namenjenih šest moderno opremljenih linij. Podjetje v laboratoriju pospešeno razvija izdelke iz okolju prijaznih surovin, ki jih uspešno vključuje v proizvodnji proces.

Velik poudarek namenja varnosti, zdravju in izobraževanju zaposlenih. Svoj položaj na tem področju pa namerava podjetje še naprej širiti s konkurenčnimi in kvalitetnimi izdelki z izvozom v EU in širše.

*Socially and environmentally responsible company Eurosol, d.o.o., Jesenice features over 25 years of experience in the production of aerosols, technical sprays, adhesives, and polyurethane foams.*

*It was established in 1997 for the development, production and marketing of polyurethane foams, adhesives, and technical sprays. The company is located in Jesenice, it employs over 60 people and boasts its own development and technologically appealing products.*

*A special advantage of the company is its great flexibility in the production and supply of the ordered products.*

*Due to an increasing product assortment and employees, the company continues to expand its business premises and warehouses.*

*The company operates six modern equipped production lines. The lab is engaged in accelerated development from environment-friendly raw materials, which are being successfully integrated in the product process.*

*The company also pays great attention to the safety, health, as well as education and training of employees. It continues to drive its expansion through highly competitive and high quality products, exports to the EU and broader.*





# HELIOS KEMOSTIK, d.o.o.

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Osnovna dejavnost podjetja Helios Kemostik je proizvodnja in trženje lepil in kemičnih izdelkov. Bogato znanje, na katerem temelji razvoj najrazličnejših lepil za profesionalne uporabnike, smo uporabili tudi za razvoj lepil za široko uporabo in domače mojstre, tako na domačem kot številnih tujih trgih.

Dolga tradicija ter obsežne izkušnje blagovne znamke Neostik ter podjetja HELIOS KEMOSTIK v visoko tehnološkem in razvojnem okolju skupine KANSAI HELIOS omogočajo hitrejši razvoj, učinkovitejšo distribucijo in dobro odzivnost na potrebe strank. Nenehne izboljšave in inovacije pa poskrbijo za razvoj izdelkov kot tudi za napredek v lokalnem okolju in širše.

*The core business of Helios Kemostik is the production and distribution of adhesives and chemical products. Extensive knowledge in the development of high-quality adhesives solutions for professional users is also the basis for the development of adhesives for broad use and DIY.*

*The long tradition and extensive experience of the Neostik brand and the HELIOS KEMOSTIK company in the high-tech and development environment of the KANSAI HELIOS Group enable faster development, more efficient distribution, and a good response to customer needs. Continuous improvements and innovations ensure product development as well as progress in the local environment and beyond.*



# MITOL, tovarna lepil, d.o.o.

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MITOL je eden vodilnih proizvajalcev industrijskih lepil v Evropi, ki že več kot 70 let ponuja visokokakovostne in inovativne rešitve na področju lepljenja.

S široko paleto izdelkov, z uporabnikom prilagojenimi rešitvami ter strokovno podporo strankam skrbijo za dolgoročne partnerske vezi. Rezultat teh prizadevanj je širok nabor visokokakovostnih lepil za industrijsko in obrtniško uporabo ter izdelkov za široko potrošnjo, ki jih uspešno tržijo v več kot 35 državah po svetu.

Podjetje že od svojih začetkov stremi k trajnostnem razvoju, ki poleg tehnološkega napredka vključuje tudi razvoj okolju prijaznih izdelkov ter izbiro proizvodnih procesov, ki ne obremenjujejo okolja.

Od leta 2017 podjetje deluje v okviru skupine Soudal, največjega evropskega proizvajalca tesnilnih mas, lepil in poliuretanske pene.

*MITOL is one of the leading European producers of industrial adhesives which has been providing high-quality and innovative gluing solutions for more than 70 years.*

*They build long-term partnerships with a wide range of products, customized solutions, and superior customer support. The result of these efforts is a wide portfolio of top-quality adhesives for industrial, professional and DIY use which are successfully sold in more than 35 countries around the globe.*

*Since its beginnings, the company strives for sustainable development which, in addition to technological progress, also includes the development of eco products and selection of production processes that do not burden the environment.*

*Since 2017, the company operates within the Soudal Group, the largest European manufacturer of sealants, adhesives and polyurethane foams.*



# TKK, d.o.o.

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V TKK razvijajo in izdelujejo lepila, tesnilne mase, poliuretanske pene, dodatke za betone in tehnične spreje. Že od leta 1947 proizvajajo izdelke najvišje kakovosti in nudijo brezhibno podporo strokovnjakom v gradbeništvu in domačim mojstrom. Več kot 500 lastnih izdelkov prodajajo v več kot 70 državah in z izvozom ustvarijo več kot 90 odstotkov prihodkov.

Podjetje je zavezano odgovornosti do okolja in deluje ob rednem monitoringu v skladu z evropskimi standardi in pridobljenim mednarodnim certifikatom POR – Programom odgovornega ravnanja.

V zadnjih letih je prejelo številne nagrade in priznanja, vsako leto pa se uvrsti tudi med najboljše slovenske izvoznike.

*TKK is a leading manufacturer of adhesives, sealants, polyurethane foams, concrete admixtures, and technical sprays. Since 1947, TKK has been producing a whole range of high-quality products and offering seamless support to construction professionals and DIY segment. More than 500 TKK's products are sold in more than 70 countries, and 90 percent of revenue is generated through exports.*

*The company is committed to sustainability, operating with regular monitoring in accordance with European standards and the acquired international certificate Responsible Care.*

*In recent years, TKK has received numerous awards and recognitions, and every year it also ranks among the best Slovenian exporters.*





## POVEZAVE DO NADALJNJIH INFORMACIJ & PUBLIKACIJ

Publikacijo LEPILA & TESNILNE MASE, Proizvodnja v Sloveniji, je pripravilo Združenje kemijske industrije (ZKI), ki je panožno strokovno združenje in deluje kot avtonomna enota v okviru Gospodarske zbornice Slovenije.

Preko ZKI članska podjetja rešujejo različna skupna vprašanja s področja zakonodaje in tehničnega napredka, v komunikaciji z drugimi deležniki pa ZKI predstavlja glas kemijske industrije.

ZKI povezuje podjetja, ki se po Standardni klasifikaciji dejavnosti (SKD 2008) pretežno razvrščajo v naslednje oddelke dejavnosti:

- proizvodnja kemikalij in kemičnih izdelkov (SKD šifra 20),
- proizvodnja farmacevtskih surovin in preparatov (SKD šifra 21) in
- proizvodnja izdelkov iz gume in plastičnih mas (SKD šifra 22),

ali pa sicer opravljajo drugačne dejavnosti, vendar jih interesi vežejo na omenjene dejavnosti, ki jih običajno skupaj imenujemo »kemijska industrija«.

Aktivnosti ZKI za posamezna področja se izvajajo znotraj **Sekcij** in **Delovnih skupin**.

Več informacij o ZKI, najdete na spletnih straneh:

- [KEMIJSKA POLITIKA](#)  
([stran za odločevalce](#))
- [GZS - ZKI](#)
- [PRAVA KEMIJA](#)
- [Program odgovornega ravnanja® - POR](#)

Za več informacij je ZKI dosegljiv preko e-pošte: [zki@gzs.si](mailto:zki@gzs.si) in tel. št.: 01/5898 257.

## LINKS TO FURTHER INFORMATION & PUBLICATIONS

*The publication ADHESIVES & SEALANTS, Production in Slovenia, was prepared by the Association of Chemical Industries of Slovenia (ACIS), which is a professional industry association and operates as an autonomous unit within the Chamber of Commerce and Industry of Slovenia (CCIS).*

*Through ACIS, member companies address various common issues in the field of legislation and technical progress, and in communication with other stakeholders, ACIS represents the voice of the chemical industry.*

*ACIS brings together companies that, according to the Standard Classification of Activities (SKD 2008), are mainly classified into the following business divisions:*

- *production of chemicals and chemical products (SKD code 20);*
- *production of pharmaceutical raw materials and preparations (SKD code 21),*
- *production of rubber and plastic products (SKD code 22),*

*or else they perform other activities, but their interests bind them to the aforementioned activities, which are usually collectively referred to as the "chemical industry".*

*ACIS activities for individual areas are carried out within **Sections** and **Working groups**.*

*You can find more information about ACIS on the following websites:*

- [CHEMICAL POLICY](#)  
([site for decision-makers](#))
- [CCIS - ACIS](#)
- [GOOD CHEMISTRY](#)
- [RESPONSIBLE CARE® - RC](#)

For more information, ACIS can be reached by e-mail: [zki@gzs.si](mailto:zki@gzs.si) and phone: +386 1/5898 257.

## Proizvodnja lepil in tesnilnih mas je del kemijske industrije.

V okviru Delovne skupine za lepila in tesnilne mase ZKI poglobljeno obravnava vsebine pomembne za člane. Med drugim jih obvešča preko branžnih novic o aktualnostih s področja. Primer izdanih e-novic si lahko ogledate na povezavi.

## The production of adhesives and sealants is part of the chemical industry.

Within the Working Group for Adhesives and Sealants, ACIS deals in depth with topics important to its members. Among other things, it informs them via industry newsletters about current events in the field. You can see an example of a published e-newsletter on the link.



Članstvo ZKI v mednarodnem neprofitnem združenju evropskih proizvajalcev lepil in tesnilnih mas - FEICA (Association of the European Adhesive & Sealant Industry) približuje slovenskim proizvajalcem najbolj aktualne teme z evropskega prostora in širše, z organizacijo webinarjev pa skrbi za opolnomočenje svojih članov.

FEICA je tudi glavni sogovornik v dialogu z evropskimi zakonodajalci pri pripravi nove ter spreminjanju obstoječe področne zakonodaje.

ACIS membership of the international non-profit Association of the European Adhesive and Sealant Industry - FEICA brings Slovenian manufacturers closer to the most current topics from the European area and beyond, and by organizing webinars, it ensures the empowerment of its members.

FEICA is also the main interlocutor in the dialogue with European legislators when preparing new and amending existing sectoral legislation.



Pod okriljem FEICA je 16 nacionalnih industrijskih združenj, ta predstavljajo 450 podjetij, dodatno pa še okoli 50 podjetij, ki so neposredni člani.

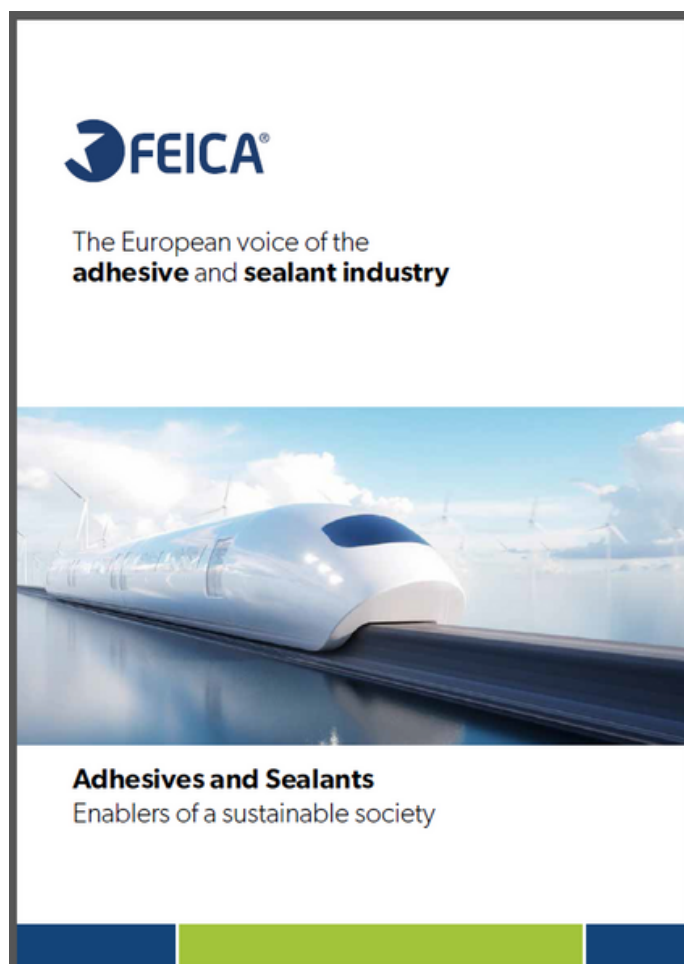
Mednarodno sodelovanje & reševanje skupnih »zelenih« in »digitalnih« izzivov, ob naraščajočem trendu zahtev po nadzorovano dolgi življenjski dobi izdelkov, recikliranju, možnosti popravil in ponovne uporabe, vzpodbudno vpliva na razvoj industrije v Sloveniji.

Oglejte si [FEICA brošure](#), ki nazorno prikazujejo delo FEICA kot združenja in kakšen je splošni pomen industrije lepil in tesnilih mas ter novice [FEICA CONNECT](#).

*There are 16 national industrial associations under the umbrella of FEICA, which represent 450 companies, and in addition around 50 companies that are its direct members.*

*International cooperation & addressing common “green” and “digital” challenges, along with the growing trend of demands for controlled longevity, recycling, the possibility of repairs and reuse, has a stimulating effect on the development of the industry in Slovenia.*

*See the [FEICA brochures](#), which illustrate the work of FEICA as an association and the general importance of the adhesive and sealant industry, as well as the [FEICA CONNECT](#) newsletter.*







 **FEICA**<sup>®</sup>

Gospodarska  
zbornica  
Slovenije 

Združenje kemijske industrije