

SAFC®

Pharma & Biopharma Raw
Material Solutions

MILLIPORE SIGMA

Customized, functionalized PEGs

From a dedicated partner with regulatory expertise

We are your global partner for the development and supply of commercial quantities of functionalized PEGs (polyethylene glycols). Those in turn, are essential for your PEGylated therapeutic proteins for drug delivery. Our offerings include high-purity materials for use in investigational products in every phase of clinical development and in commercialized products. We understand that you care about rapid and cost-effective time to market. Therefore, setting the right quality attributes for the functionalized PEG is crucial for the manufacturing and stability of your PEGylated product — we can help you get it right. And during the marketing phase, expertise in life-cycle management and regulatory affairs can help you safeguard your compliance.



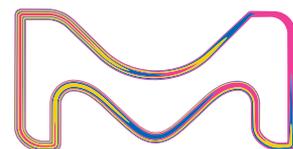
Custom development expertise for functionalized PEGs

Our experience in the development and scale-up of functionalized PEGs — ranging from pre-clinical evaluations to large-scale commercial quantities — has a long tradition. Our development projects can be highly customized to your individual needs supported by our dedicated experts and worldwide presence. We can assist you in exploration of synthetic pathways (feasibility), process development, manufacturing under GMP, as well as analytical test methods and validation. All backed by the required QA and QC and an excellent audit record. At the respective development stage, quality and supply agreements will support your supply security on a commercial scale. With MilliporeSigma, you have a partner you can count on to help you get your product to market more quickly.

Our offering is complemented by multi-arm functionalized PEGs used for hydrogel-type biodegradable medical devices with *in situ* cross-linking properties as well as by customized, bi-functional PEGs acting as linkers for e.g. antibody-drug conjugates. Contact us today to find out how we can help you develop the specific, functionalized PEG you require to meet your formulation needs and to help enhance the bioavailability of your final drug.

Our offering:

- Customized product development and standard product range
- Support in every phase of development and marketing
- Regulatory expertise from our dedicated team
- Extensive analytical capabilities and stability studies
- Consistent high product quality from grams to tons
- cGMPs and site standards that follow the concepts of ICH Q7
- An excellent track record of customer and FDA audits



Our portfolio of ready-to-use functionalized PEGs

Activation chemistry	Target group for conjugation reaction	MW [kDa]
Linear MPEGs		
-ethylamine	-carboxyl	5/20/30
-propylamine	-carboxyl	10/12
-carboxymethyl	-amine, -hydroxyl	3/20
-ethyl-iodoacetamide	-thiol	20
-propyl-iodoacetamide	-thiol	20
-oxyamine	-aldehyde, -ketone	20/30
-para-nitrophenylcarbonate	-amine	20/30
-succinimidylcarbonate	-amine, -hydroxyl	5/20
-succinimidylsuccinate	-amine, -hydroxyl	5
-succinimidylhexanoate	-amine, -hydroxyl	20
-ethylthiol	-thiol, -acrylate	5/10/20
Maleimides		
-ethylmaleimide	-thiol	5
-propylpropionato-maleimide	-thiol	5/20/30
Aldehydes		
-acetaldehyde	-amine	20
-propionaldehyde	-amine	20
Branched PEGs		
MPEG ₂ -lysine branching unit for subsequent specific activation	According to needs	2x20
MPEG ₂ -40kDa-lys-EP-mal	-thiol	2x20

Other molecular weights are optional. Samples for R&D purposes available within a few weeks. Delivery of commercial quantities on request.

The typical technical data above serve to generally characterize the product. These values are not meant as specifications and they do not have binding character. The product specification is available separately, from the website: EMDMillipore.com

We provide information and advice to our customers on application technologies and regulatory matters to the best of our knowledge and ability, but without obligation or liability. Existing laws and regulations are to be observed in all cases by our customers. This also applies in respect to any rights of third parties. Our information and advice do not relieve our customers of their own responsibility for checking the suitability of our products for the envisaged purpose.

For additional information, please visit EMDMillipore.com
To place an order or receive technical assistance, please visit EMDMillipore.com/contactPS

Activation chemistry	Target group for conjugation reaction	MW [kDa]
Linear bifunctional PEGs		
PEG-bis-ethylamine	-carboxyl	2/10
PEG-bis-para-nitrophenylcarbonate	-amine	5/10/20
PEG-bis-oxyamine	-aldehyde, -ketone	5/10/20
PEG-bis-ethyl propionato-maleimide	-thiol-linker-thiol-	1/2/10
MAL-PP-PEG-pAld	-thio-linker-amine	10
pAld-PEG-pAld	-amine-linker-amine	3.34
Multi-arm PEGs		
4-arm-acrylate	-thiol, -amine	2/15
8-arm-acrylate	-thiol, -amine	2
4-arm-propylthiol	-thio, -acrylate	2
4-arm-para-nitrophenylcarbonate	-amine	5/15/20
4-arm-ethylamine	-carboxyl	5/10/20
4-arm-succinimidylglutarate	-amine, -hydroxyl	10/20
4-arm-succinimidylcarbonate	-amine, -hydroxyl	10/20
4-arm-ethyl propionato-maleimide	-thiol	20
4-arm-propyl propionato-maleimide	-thiol	20
Monodisperse PEGS		
Backbone chemistry and activation	various	up to 2kDa

