Technical Information

Kollidon® 25
Kollidon® 30
Kollidon® 30 LP
Kollidon® 30 NT

Povidone

August 2025 | MarComm-2025-00196

BASF
We create chemistry

1. Introduction

Povidone, soluble polyvinylpyrrolidone (PVP), is one of the most widely utilized excipients in the pharmaceutical industry. Its exceptional solubility and high binding capacity make it particularly effective as a wet binder in solid oral dosage forms. The history of Povidone dates back to the 1930s when chemist Walter Reppe first synthesized polyvinylpyrrolidone polymers in BASF laboratories. As the originator of Povidone, BASF continues to market these products under the Kollidon® brand.

Soluble polyvinylpyrrolidone can be produced on commercial scale in a wide range of different molecular weights. In the Pharmacopoeias, Povidone grades are typically characterized by the K-value which correlates to the relative viscosity of the polymer in water and therefore, to the mean molecular weight of the polymer chains. BASF Kollidon® portfolio offers a comprehensive selection of Povidone grades, encompassing low, medium, and high molecular weight products to meet various formulation needs.

This Technical Information covers products in the medium molecular weight range:

Kollidon® 25

Kollidon® 30 Origin Germany

Kollidon® 30 Origin USA

Kollidon® 30 Origin China

Kollidon® 30 NT Origin Germany

Kollidon® 30 LP

BASF manufactures Kollidon® 30 at three production sites globally in the US, China, and Germany. The three products are fully equivalent, but for differentiation in purchasing and supply processes, the origin has been added to the product brand name: Kollidon® 30 Origin Germany, Kollidon® 30 Origin USA, Kollidon® 30 Origin China.

Kollidon® 30 NT Origin Germany (NT = nitrite tested) is fully identical to Kollidon® 30 Origin Germany but comes with an additional service: each lot is tested for nitrites.

Kollidon® 30 LP (LP = Low Peroxide) is a specialty grade with an antioxidant targeted for peroxide sensitive formulations.

All Kollidon® 25 and Kollidon® 30 products are white powders with a faint, characteristic odor, exemplary shown for Kollidon® 30 Origin Germany (Fig. 1).

Fig. 1: Kollidon® 30 Origin Germany

Dedicated Technical Information documents are available for further BASF Kollidon® products: Kollidon® 12 PF and 17 PF, Kollidon® 90 Evo, Kollidon® VA 64, and Kollidon® CL, CL-F, CL-SF and CL NT. More details on povidone and crospovidone, are described in the books, “Kollidon®, Polyvinylpyrrolidone for the pharmaceutical industry”, published by BASF or “Polyvinylpyrrolidone-Excipients for Pharmaceuticals”, published by Springer-Verlag, ISBN 3-540 23412-8

2. Chemical and Physical Properties

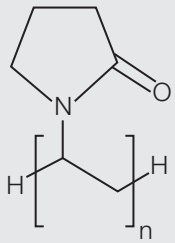
Names

Soluble polyvinylpyrrolidone is also known as povidone, povidonum, polyvidone, poly(1-vinyl-2-pyrrolidone) and PVP.

CAS number

9003-39-8

Structural formula



Production information and products range

The manufacturing process includes as first step the radical polymerization of the monomer N-vinylpyrrolidone in water to give a polymer solution, followed by spray-drying for obtaining the products in powdery form.

The molecular weight distribution of the polymer chains, and therefore the K-value of the products is controlled with the polymerization step. The particle size distribution of the final powder form is determined with the spray-drying step.

Kollidon® 25 and Kollidon® 30 are of the same chemical nature, but Kollidon® 25 has a slightly lower molecular weight compared to Kollidon® 30.

Whereas Kollidon® 25 is produced in Germany only, BASF produces Kollidon® 30 at three production sites globally in the USA, China, and Germany. The three products are fully equivalent but are provided with specific names and articles to facilitate the purchasing processes:

- Kollidon® 30 Origin Germany
- Kollidon® 30 Origin USA
- Kollidon® 30 Origin China,

In the high quality-controlled production processes for all Kollidon® grades there are no known risks for nitrite presence as described in the respective Risk Assessment statements that are available in RegXcellence®. High lot-to-lot consistency is demonstrated with no quantifiable levels of nitrites detected, based on the LOQ of respective fully validated nitrite test methods.

Kollidon® 30 NT Origin Germany (NT = Nitrite Tested) is produced employing the identical manufacturing process, raw materials and equipment as Kollidon® 30 Origin Germany. However, Kollidon® 30 NT Origin Germany is offered with the additional service that nitrites are tested for each lot and the results are provided on the CoA.

All information and data in this document are equally applicable to all Kollidon® 30 products, including Kollidon® 30 NT Origin Germany. For simplification, the denomination Kollidon® 30 is therefore used for all those products in the following chapters.

Kollidon® 30 LP (LP = Low Peroxide) is a specialty low peroxide grade with an antioxidant targeted for the formulation of peroxide sensitive drugs. It can be applied as wet binder like Kollidon® 30, and it is manufactured only in Ludwigshafen.

Molecular weight

As inherent to polymers, soluble Kollidon® grades have polymer chains of different lengths and can thus be described by their molecular weight distribution, ideally described by a gaussian curve.

The molecular weight of polymers can be expressed in three forms: weight average molecular weight, number average molecular weight, and viscosity average molecular weight.

The viscosity average molecular weight finds application in the Pharmacopoeias for the characterization of povidone. The K-value of aqueous Povidone solutions is calculated from viscosity, measured via a capillary viscometer, and relates to the molecular weight of the polymers.

The weight average molecular weight (Mw) can be determined by means of Size Exclusion Chromatography (SEC) in combination with a detection system based on multi angle light scattering (MALLS).

Table 1:	Nominal K-Value	K-Value Range	Mw Range [g/mol]
Kollidon® 25	25	22.5 – 27.0	28000 – 35000
Kollidon® 30	30	27.0 – 32.0	38000 – 56000
Kollidon® 30 LP	30	27.0 – 32.0	38000 – 56000

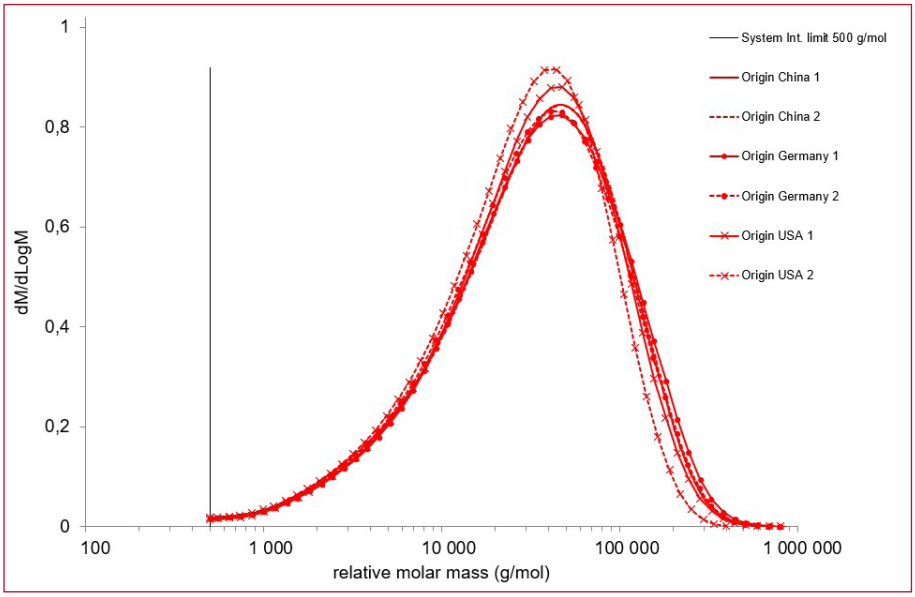


Fig. 2: Exemplary molecular weight distribution of Kollidon® 30 samples measured by SEC on PL HFIPGel column (styrene-divinylbenzene) employing hexafluoroisopropanol (HFIP) with 0,05% trifluoroacetic acid potassium salt as eluent.

Viscosity

Kollidon® 25 and Kollidon® 30 aqueous solutions have low to medium viscosity, thereby showing the typical behavior of PVP with medium molecular weight, as shown in Fig. 3.

Fig. 4 shows the relationship between the viscosity of aqueous solutions of the different grades of Kollidon® and their concentration.

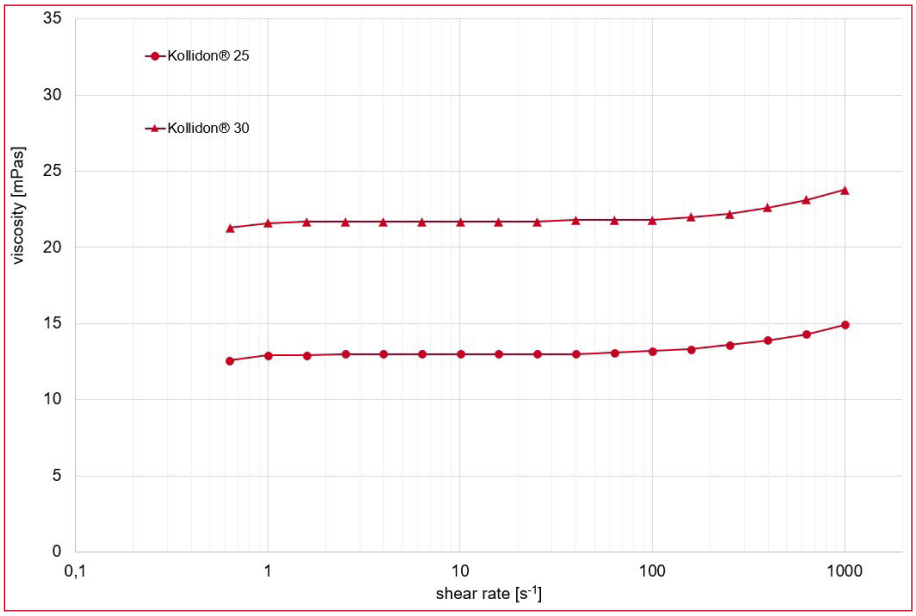


Fig. 3: Shear viscosity of Kollidon® 30 and Kollidon® 25 aqueous solution with 20% concentration (rotation rheometer, 25 °C)

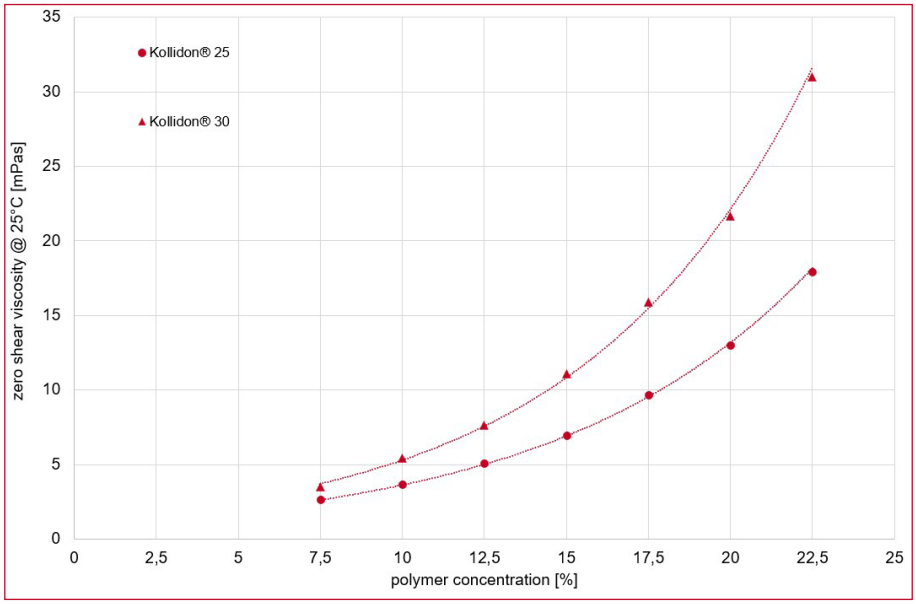


Fig. 4: Zero Shear Viscosity of Kollidon® solutions depending on their concentration (rotation rheometer, 25 °C)

Solubility

Kollidon® 25 and Kollidon® 30 grades are highly soluble in water and many polar solvents like isopropanol, methanol, or propylene glycol but show limited solubility in hydrocarbon solvents. In Table 2, "soluble" indicates that a solution of at least 10 g/l can be achieved, whereas "insoluble" denotes a solubility of less than 1 g/l.

Table 2: Solubility of Kollidon® 25 and 30 products	
Soluble in (min. 10 g/l):	
chloroform	n-butanol
cyclohexanol	n-propanol
ethanol abs.	polyethylene glycol 300
glycerol	polyethylene glycol 400
isopropanol	propylene glycol
methanol	triethanolamine
methylene chloride	water
Insoluble in (max. 1 g/l):	
cyclohexane	pentane
diethyl ether	carbon tetrachloride
ethyl acetate	toluene
liquid paraffin	xylene

Glass transition temperature Tg_2

Glass transition temperature (Tg) of a polymer is the temperature at which the material transitions from a brittle, glassy state to a more flexible, rubbery state. Upon approaching Tg, polymer chains gain mobility, leading to increased flexibility and ductility. The Tg can vary based on factors like molecular weight of the polymer chains, composition and impurities, and the presence of plasticizers.

Due to higher molecular weight, Kollidon® 30 has a higher Tg than Kollidon® 25.

The glass transition temperatures (Tg_2) given below are determined by means of differential scanning calorimetry (DSC). To exclude the water content impacting the result by acting as a plasticizer, two heating cycles are conducted for the measurement. The first heating cycle ensures the elimination of water from the sample. After cooling the dried polymer to room temperature, the Tg_2 is then determined in a second cycle.

Table 3:	Tg_2 [°C]
Kollidon® 25	165
Kollidon® 30	171

Complexation, chemical interactions

Povidone can form associates or complexes with various active substances. A well-known example is the complex with iodine (“PVP-iodine”), which is also offered by BASF.

The ability of Kollidon® to form water-soluble complexes with insoluble active substances can be utilized in pharmaceuticals to enhance the release rate and solubility of drugs. A few substances, such as polyphenols, form stronger complexes that may precipitate in neutral or acidic environments.

It is important to note that combining Povidone with strongly alkaline substances, such as lithium carbonate or sodium hydroxide, may cause crosslinking. As result, the materials may become insoluble, or viscosity of solutions may increase.

Particle Size Distribution

Both particle size and particle morphology of Kollidon® 25 and Kollidon® 30 are controlled in the final drying step of the production process, the spray drying.

The particle size distribution (PSD) of Kollidon® powders has no impact on the performance of the polymers as wet binders when the powders are dissolved prior to application. The PSD analyzed using a sieving method, gives the typical ranges shown in Table 4.

PSD measured by means of laser diffraction gives the typical ranges shown in Table 5.

Table 4:	PSD by sieving	
	< 50 µm [%]	> 250 µm [%]
Kollidon® 25	max. 40	max. 5
Kollidon® 30	max. 40	max. 5

Table 5:	PSD by laser diffraction		
	d (0.1) [µm]	d (0.5) [µm]	d (0.9) [µm]
Kollidon® 25	15 – 17	51 – 56	121 – 126
Kollidon® 30	11 – 26	43 – 88	93 – 201

Particle morphology

The particle morphology of Kollidon® 25 and Kollidon® 30 examined by means of scanning electron microscopy (SEM) shows the typical pattern of spray dried powders, consisting of hollow spheres with few debris.

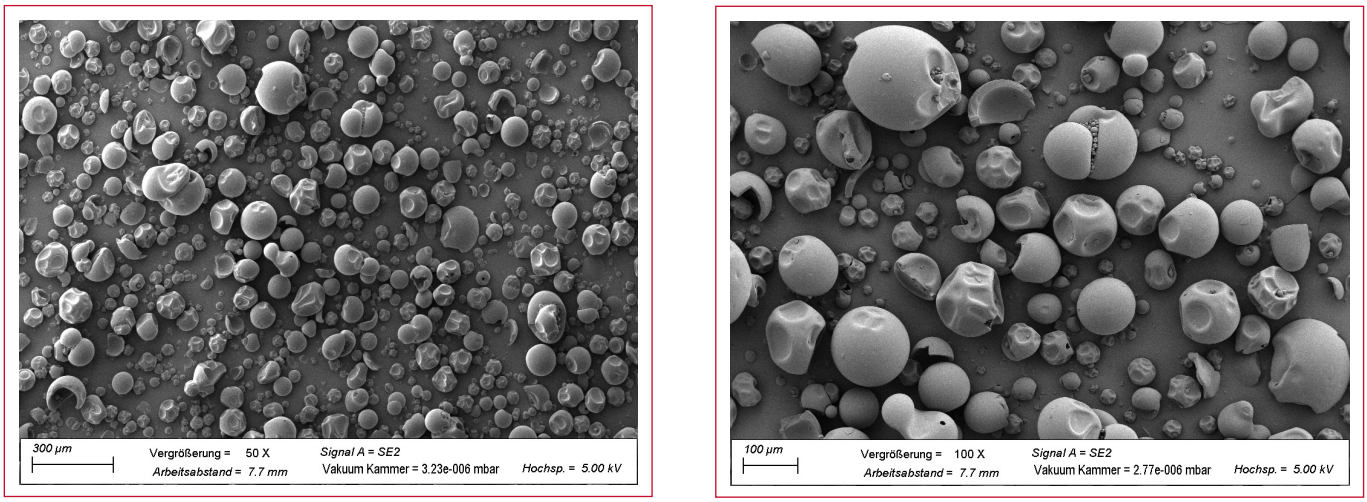


Fig. 5: Kollidon® 30 powder by Scanning Electron Microscopy (50 & 100 magnification)

Flowability

Typical values for angle of repose and flowability of Kollidon® 25 and Kollidon® 30 powders measured with a Pfrengle funnel flow tester (orifice diameter 10 mm) are reported in Table 6.

Table 6: Flowability	Angle of repose [°]	Flow time [s]
Kollidon® 25	25 – 29	3 – 6
Kollidon® 30	25 - 38	5 - 7

Bulk density

Bulk density of the powders is measured according to Ph. Eur. current edition, method 2.9.34.

Table 7:	Bulk density [g/ml]
Kollidon® 25	0.40 – 0.65
Kollidon® 30	0.45 – 0.55

Particle size distribution and bulk density are characteristic values for Kollidon® 25 and Kollidon® 30 and are not part of the products specifications.

Hygroscopicity

Kollidon® 25 and Kollidon® 30 are hygroscopic and tend to absorb water. Sorption isotherms illustrate the water absorption behavior of the materials in dependency of the relative humidity. The graphical representations show the relationship between a material's moisture content (represented by the increase of mass over time) and its equilibrium relative humidity at a constant temperature.

The measurements show almost identical water-uptake behavior for Kollidon® 25 and Kollidon® 30 (Fig. 7). At ~ 80% relative humidity the hygroscopic polymers absorb so much water that they finally dissolve completely and define the end of the measurement.

These similarity of the results for Kollidon® 25 and 30 is expected due to their equal chemical composition and similar molecular weight distribution.

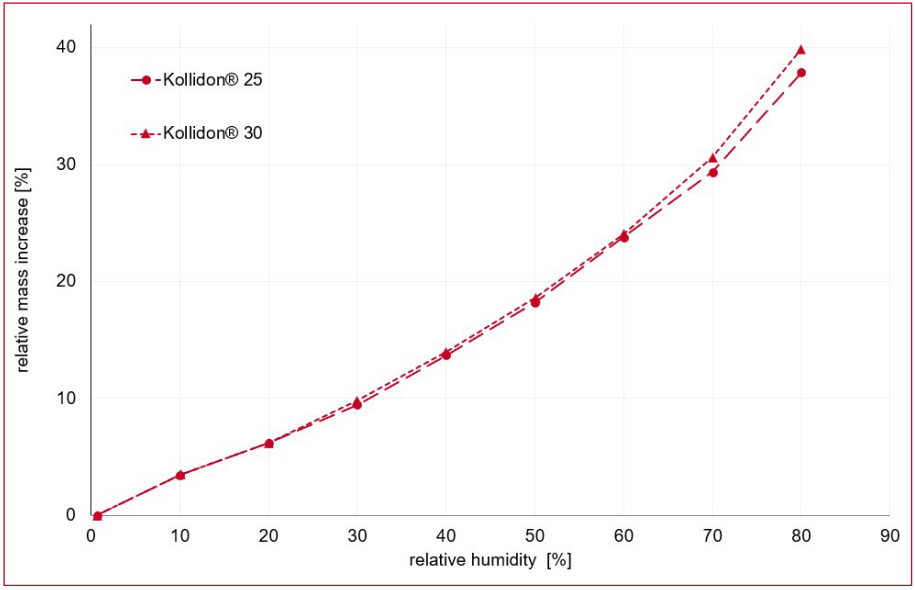


Fig. 7: Kollidon®25 and Kollidon® 30 Sorption isotherms measured with Proumid SPSx-1µ at 25°C

3. Handling / Processing Instructions

Kollidon® 25, Kollidon® 30 Origin Germany, Kollidon® 30 NT Origin Germany and Kollidon® 30 LP are packaged employing the PeroXeal® concept. This minimizes peroxide formation by eliminating, as far as possible, oxygen in the packaging. BASF´s PeroXeal® concept includes filling the product powders, using inert gas, into a liner with oxygen barrier properties and heat-sealing this liner for proper closure. It is important to point out that the protection provided by PeroXeal® is only intact until the first opening of the original sealed packaging.

For sensitive applications, BASF recommends proper reclosure, rapid consumption, and/or monitoring for peroxide levels.

Please refer to the individual material safety data sheet (MSDS) for instructions on safe and proper handling and disposal. Material safety data sheets are sent with every consignment.

The actual version of the safety data sheet is accessible via MyProductWorld.

4. Example application

The main applications of the soluble Kollidon® grades are summarized in Table 8.

Table 8:	Main applications of Kollidon® 25 and Kollidon® 30
(Wet) Binder	Tablets, capsules, granules
Bioavailability enhancement	Tablets, capsules, granules, pellets, suppositories, transdermal systems
Film formation	Tablets, medical plastics
Solubilization	Oral and topical solutions
Lyophilizing agent	Oral lyophilizates
Stabilization of suspensions	Oral instant beverage powders and granules for redispersion
Viscosity modifier	Liquid formulations
Adhesive	Transdermal systems, adhesive gels
Drug stabilization	Enzymes in diagnostics

The adhesive, film-forming, dispersing, and thickening properties of Kollidon® 25 and Kollidon® 30 are utilized in various granulation technologies for tablet production, film coating, and preparation of other dosage forms.

The selection of the best suitable Kollidon® grade is based mainly on its molecular weight, which determines the viscosity, binding effect and complexation capacity. Kollidon® 25 and Kollidon® 30 grades have less stronger binding performance compared to high molecular weight Kollidon® 90 Evo; however, their lower solution viscosities can enable a broader application range.

More detailed information about these applications can be found in the book, “Kollidon®, polyvinylpyrrolidone for the Pharmaceutical Industry.”

The examples below illustrate possible applications.

Binder in High Shear Wet Granulation: Placebo Formulations

Kollidon® 25 and Kollidon® 30 are typically applied as binder with quantities in the range of 2% - 5%, relative to the tablet weight.

When utilized for granulation in high shear mixers or fluid-bed granulators, the resulting granules with Kollidon® 25, Kollidon® 30 or Kollidon® 30 LP exhibit excellent hardness, free-flowing properties, and a low proportion of fines. The binding properties ensures the production of strong and stable tablets.

Example granulation with Dicafos A60 *(dicalcium phosphate)*
The placebo granules are obtained by agglomerating the filler in a high shear mixer with a 25% Kollidon® 30 aqueous solution. The granules are sieved first with 1.6 mm mesh size and after drying with a 0.8 mm mesh size sieve. The ratio of povidone in the dried granules is 3% by weight.

The binding effect is demonstrated by comparing the particle size distribution of pure Dicafos A60 with the granules containing Kollidon® 30 (see fig. 8) that have a size range suitable for tablets compression.

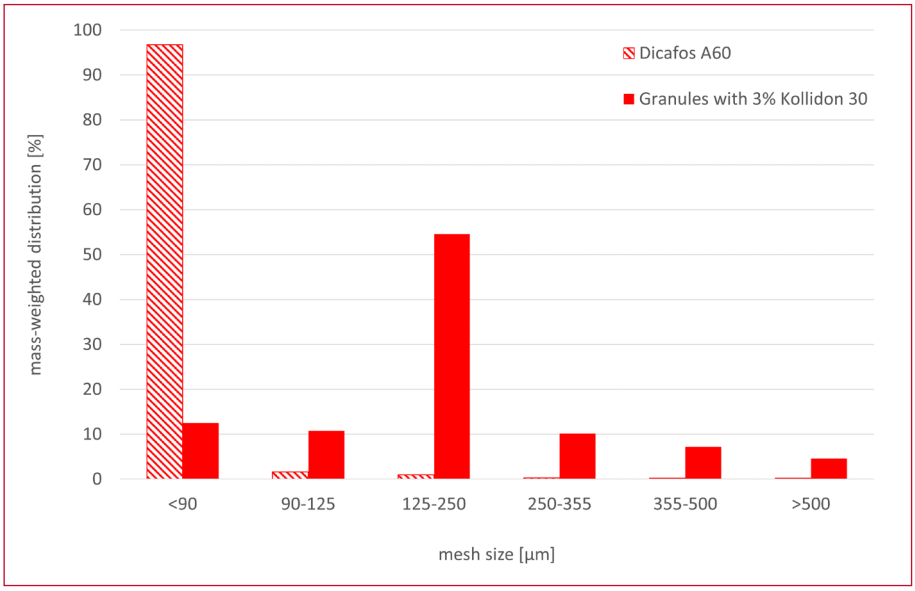


Fig. 8: PSD (sieving tower) comparison: pure dicalcium phosphate vs. dicalcium phosphate granules containing 3% Kollidon® 30

Example granulation with lactose
The second example shows a lactose placebo formulation obtained by granulation in high shear mixer, followed by tableting. As illustrated in Figure 9, the process gives strong tablets and there is no substantial difference in their strength by using Kollidon® 25 or Kollidon® 30.

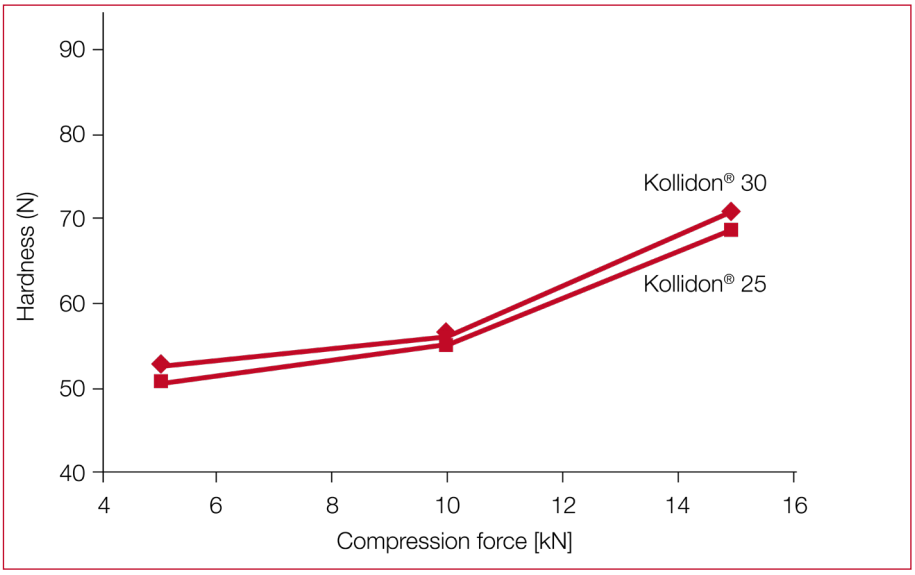


Fig. 9: Lactose monohydrate tablets with 3% Kollidon (wet granulation)

Binder in High Shear Wet Granulation: Propranolol and Paracetamol Formulations

Propranolol tablets usually have a low API load and contain high ratio of lactose as filling material, this can impair their processability. The example demonstrates that applying Kollidon® 30 as binder supports the wet granulation with this active (Fig. 10 and 11). Strong and stable tablets are obtained by applying moderate compression pressure without impacting the drug dissolution profile (Fig. 12).

Table 9:	Propranolol tablets composition [g/100g]
Kollidon® 30	2.8
Propranolol HCL	9.5
Granulac 230	82.2
Kollidon® CL-F	5
Magnesium stearate	0.5

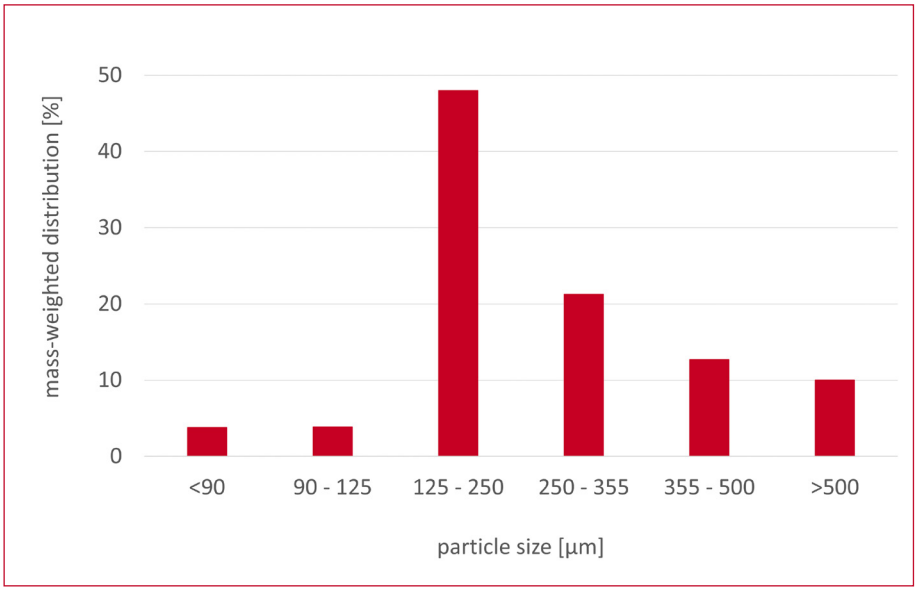
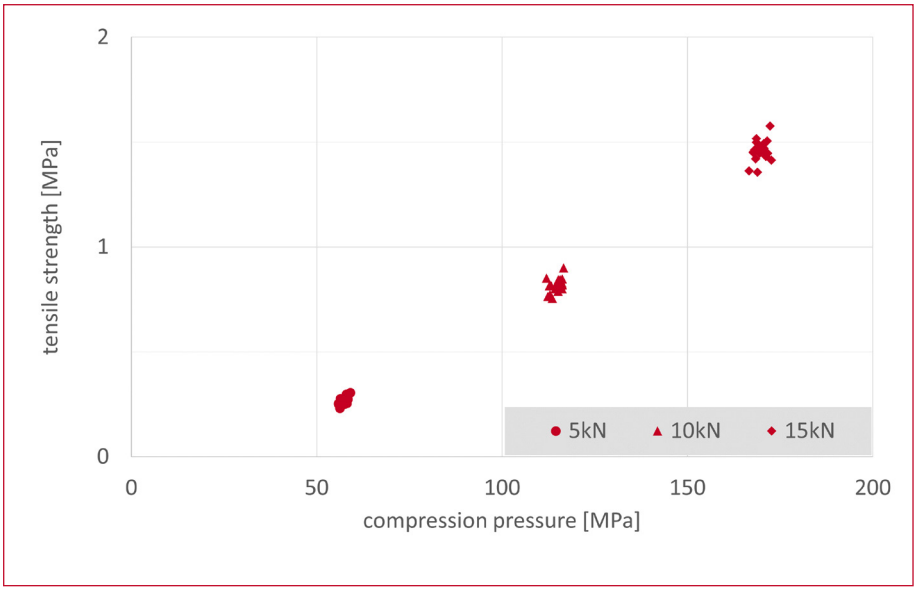


Fig. 10: PSD (by sieving) of Propranolol granules



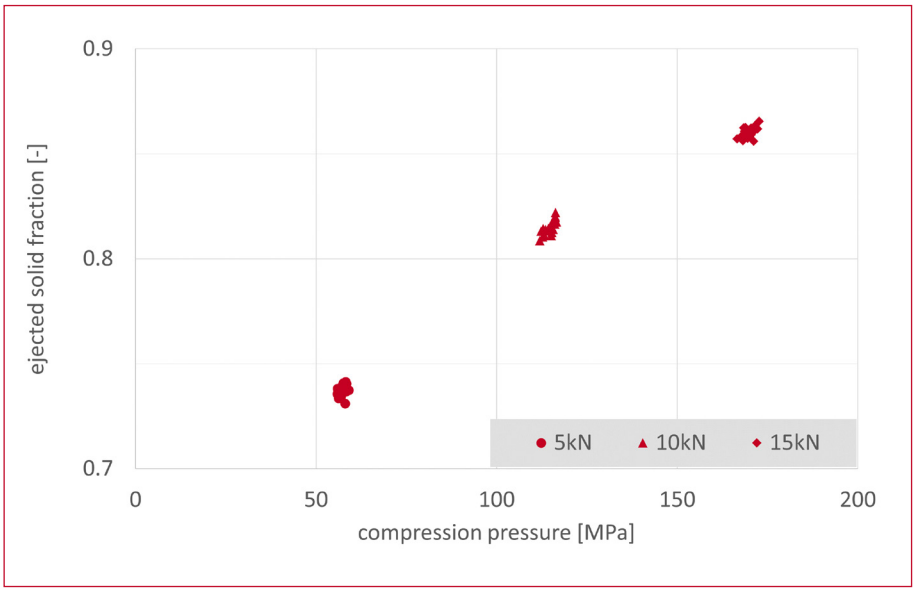


Fig. 11: Tabletability and compressibility profile of Propranolol tablets (diameter 10 mm, weight 250 mg) obtained with Style`One Compaction simulator

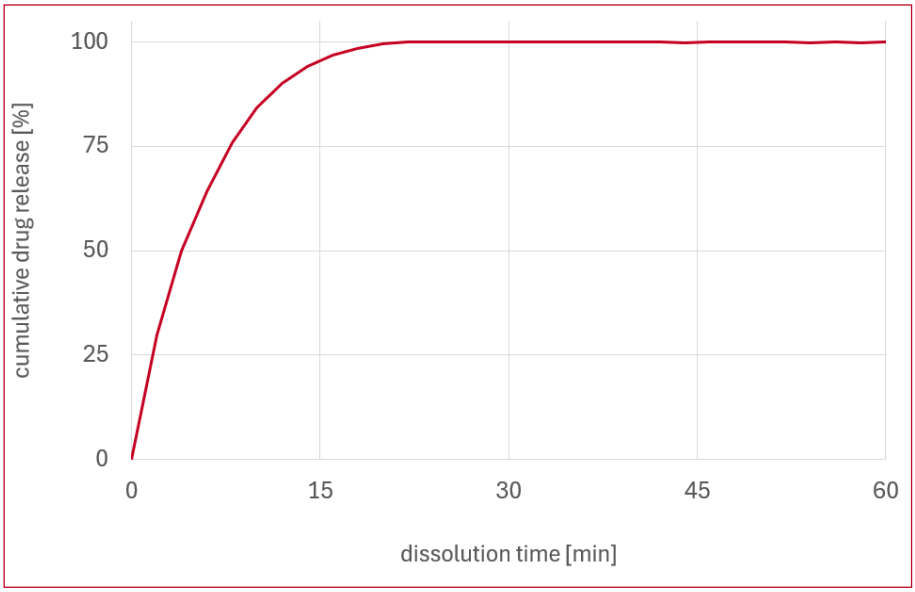


Fig. 12: Propranolol release (tablets tested according to Ph .Eu. Chapter 2.9.3)

Paracetamol tablets on the contrary, have a high API concentration with no filling material. The example demonstrates the versatility and efficiency of Kollidon® 30 also in such formulations: after wet granulation (Fig. 13), the compression of the granules gives stable tablets with desired strength (Fig. 14) and dissolution profile (Fig. 15).

Table 10:	Paracetamol tablets composition [g/100g]
Kollidon® 30	4.7
Paracetamol	89.8
Kollidon® CL-F	5
Magnesium stearate	0.5

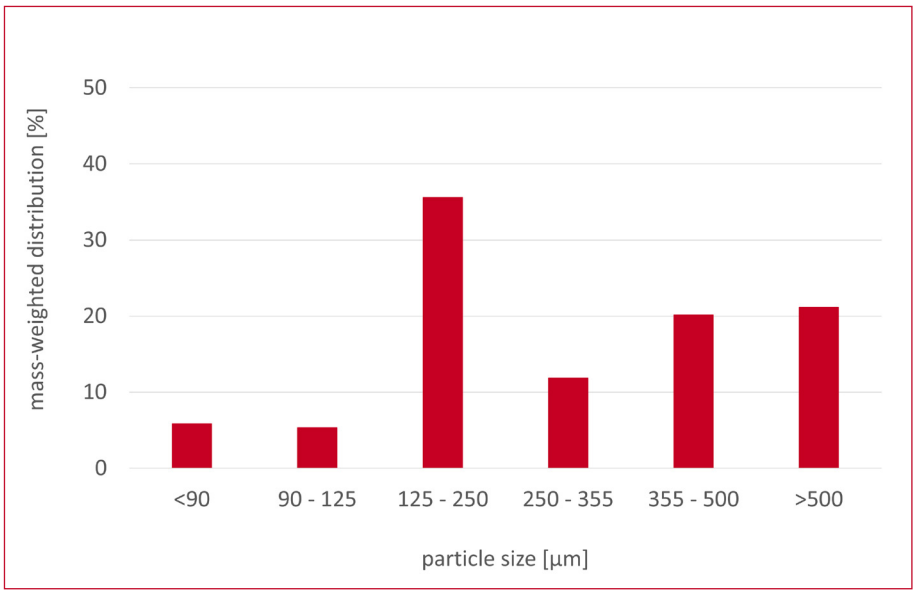
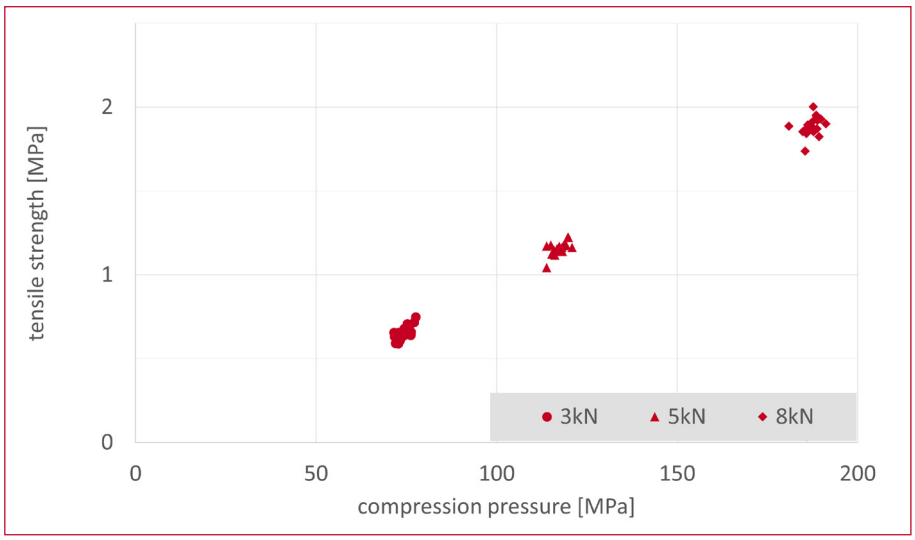


Fig. 13: PSD (by sieving) of Paracetamol granules



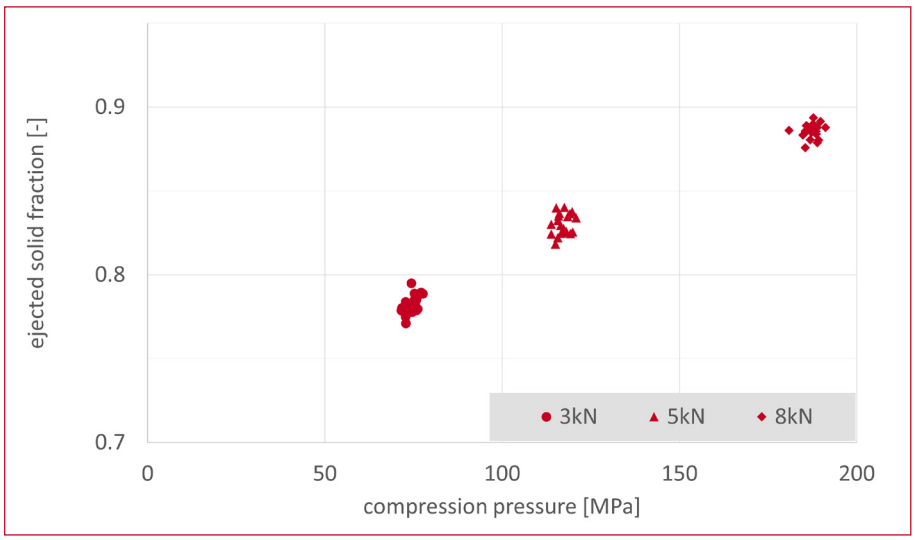


Fig. 14: Tabletability and compressibility profile of Paracetamol tablets (diameter 7 mm, weight 100 mg) obtained with Style`One Compaction simulator

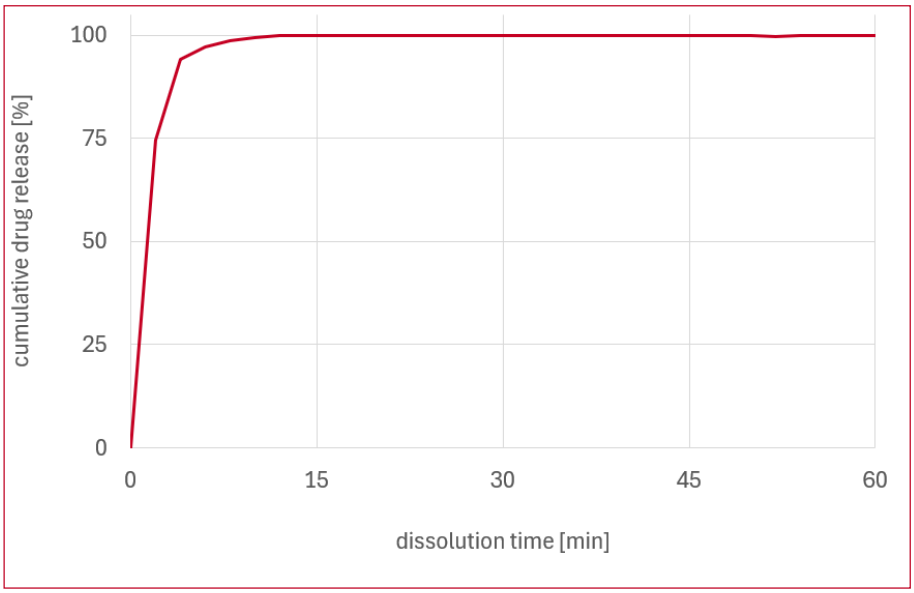


Fig. 15: Paracetamol release (tablets tested according to Ph .Eu. Chapter 2.9.3)

Binder in Fluid Bed Granulation: Metformin Tablets

Outstanding binding properties are important to formulate dosage forms with high drug load and eventually no filler by employing fluid bed granulation. Metformin tablets are a typical example of such formulations. For this granulation, an optimal distribution of the binder solution is key to ensure that the APIs get evenly wetted by the binder. Solutions of Kollidon® 25 and 30 are perfectly suited as they prepare quickly and spray easily due to their low viscosity, forming stable granules rapidly. An exemplary formulation (Table 11) is obtained by spraying Kollidon® 30 as 20% aqueous solution on metformin HCl.

Table 11:	**Composition of Metformin Granules Ratio [g/100g]**
Metformin HCl	94.5
Kollidon® 30*	5.0
Silicium dioxide**	0.5

**Added as 20% aqueous solution* ***Aerosil 200, added extra granular*

Table 12:	**Metformin Fluid Bed Granulation Process Parameters***
solution spray rate	5 g/min
nozzle diameter	1 mm
air pressure	2.0 bar
flow rate of process gas	40-50 m^3/h
inlet temperature	55°C

** Equipment: Innojet Ventilus 1*

The resulting granules have low friability and fines (Fig. 16 and 17). After blending with Aerosil they are compressed into round shaped 500 mg tablets.

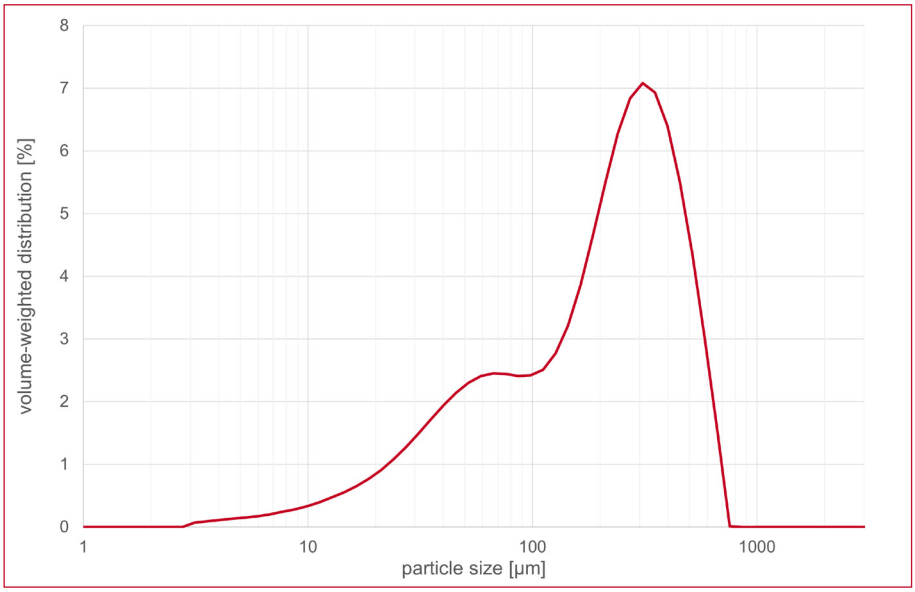


Fig.16: Particle size distribution of metformin - Kollidon® 30 granules tested with Malvern Mastersizer 3000

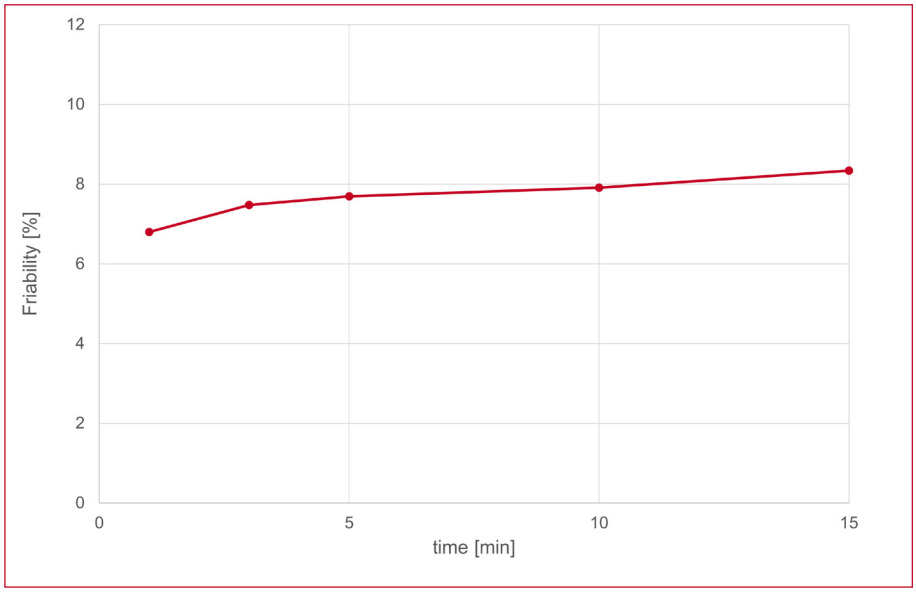


Fig. 17: Friability of metformin - Kollidon® 30 granules tested with air jet sieve Retsch AS 200 jet (30 mbar)

The tabletability plot (Fig. 18) outlines the binding performance of Kollidon® 30 as only 5% binder is used in the formulation and no further fillers or binders are applied.

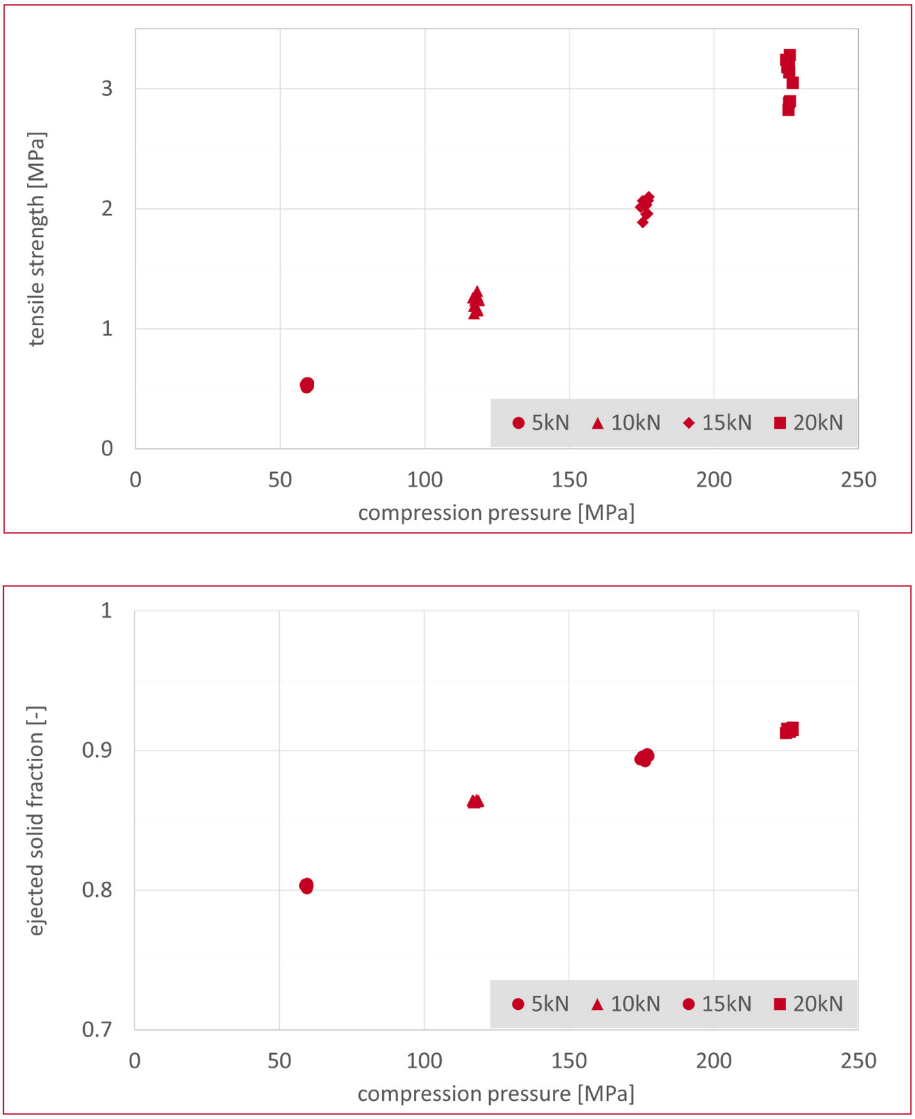


Fig. 18: Tabletability and compressibility profile of metformin tablets (diameter 10 mm, weight 500 mg) obtained with Style`One Compaction simulator

Co-precipitation, co-milling

The dissolution and absorption rates of poorly water-soluble drugs can be significantly enhanced by co-milling or coprecipitation with Kollidon® 25 or Kollidon® 30. This process forms a solid solution of the drug in Kollidon® and requires an excess of Kollidon® to keep the drug in a (partially) amorphous state. Methods include mixing, co-milling, melt extrusion, coprecipitation, granulation onto a carrier, or spray-drying a solution of the drug and Kollidon®. Numerous publications document this application, with nifedipine being a frequently tested substance.

Stabilizers of suspensions

These grades can be utilized to stabilize oral and topical suspensions containing various active ingredients such as acyclovir, ibuprofen, magaldrate, nystatin, phenytoin, trimethoprim, sulfonamides, and antibiotics, as well as sugar-coating suspensions.

5. Stability & Safety

The product is typically stable for 48 months after date of production provided storage under recommended conditions. The actual retest period and storage conditions can be found in RegXcellence.

The actual version of the safety data sheet is accessible via MyProductWorld and sent with every consignment.

6. Available Articles and Packaging

Product name	PRD number*	Article number	Article	Packaging
Kollidon® 25	30034967	57254799	25 kg commercial article	Cardboard box with liner
		50348143	0.5 kg non-commercial technical sample	HDPE pail with liner
Kollidon® 25	30697299	50574244	50 kg commercial article	HDPE drum with liner
		50574245	0.5 kg non-commercial technical sample	HDPE pail with liner
Kollidon® 30 Origin Germany	30034974	57254693	25 kg commercial article	Cardboard box with liner
		50347978	0.5 kg non-commercial technical sample	HDPE pail with liner
Kollidon® 30 Origin Germany	30525451	50022331	50 kg commercial article	HDPE drum with liner
		50347978	0.5 kg non-commercial technical sample	HDPE pail with liner
Kollidon® 30 Origin USA	30403404	55087337	50 kg commercial article	HDPE drum with liner
		55238758	1 kg non-commercial technical sample	HDPE bottle
Kollidon® 30 Origin China	30660388	50486018	50 kg commercial article	HDPE drum with liner
		50498559	0.5 kg non-commercial technical sample	PP pail with liner
Kollidon® 30 LP	30255812	50796353	25 kg commercial article	Cardboard box with liner
		50347979	0.5 kg non-commercial technical sample	PP pail with liner
Kollidon® 30 NT Origin Germany	30857107	50866306	50 kg commercial article	HDPE drum with liner
		No separate sample article is offered for Kollidon® 30 NT as the product is fully identical to Kollidon® 30 Origin Germany..		

* BASF's commercial product number.

7. Documents, Quality & Regulatory Information

Meet your Virtual Pharma Assistants!

MyProductWorld, RegXcellence® and ZoomLab™

www.virtualpharmaassistants.basf.com

MyProductWorld: article numbers, sample order, safety data sheet, sustainability information

RegXcellence: specification, compliance documents, regulatory product summary

ZoomLab: formulation assistance to predict starting formulations and expedite drug development.

August 2025