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# Price List 2017

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## Miscellaneous

The company BS-Partikel is manufacturing certified particle standards by sophisticated syntheses, cleaning and characterization processes since 1999 and is offering them for most diverse applications world wide since 2001.

These particle products can be obtained directly from us and in several countries directly from our authorized local dealers as well. At present we are supplying more than 440 customers all over the world. Because of intensive contacts and communications with many customers we know that they are not only satisfied with our particle products they also appreciate our free of charge custom-related and scientifically driven guidance before and after purchasing. **Convince yourself: speak with us!**

## Product Range

### Particle Products

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3. Particle Powder Standards	(Pu Series)	S. 4
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## Prices and Distribution

We **guarantee price stability** of our particle products until:

**Februar 16<sup>th</sup>, 2018**

For products of other manufacturer we can **not guarantee price stability**: [please ask for current price!](#)

All Prices are listed in Euro. EU customers please note that the valid VAT has to be added (19%) if you do not tell us your VAT ID number. The term of payment is that the total value of the invoice has to be transferred within 30 days after date of invoice onto our bank account in Euro. We do not accept cheques and we reserve the right to demand payment in advance for future sales if we receive payment after these 30 days. All bank fees have to be paid by the orderer completely.

We maintain a comprehensive inventory for you to make sure that all listed products can be delivered in general immediately: after receiving a purchase order by letter, fax or email we return an order confirmation by fax or email in any case. Typically we ship (EXW) the ordered items 48h after the order confirmation.

If the ordered items exceeds a certain value the shipping is at no charge, below those limits there are global shipping charges:

	Germany	EU	Europe	World
Shipping Charges	8.00 €	25 €	35 €	<a href="#">please ask!</a>
Free Shipping	≥ 250 €	≥ 500 €	≥ 750 €	≥ 1500 €

## 1. Size Calibration Standards for Particle COUNTERS (LS Series)

All the particle size standards are NIST traceable and designed for size calibration of particle counters and for validation of these instruments with respect to size accuracy, size resolution, precision, reproducibility, etc.

Nominal Size	Certified Particle Diameter (Mode)	Rel. Standard Deviation (C.V.)	Quantity	Catalog Number	Price [Euro]
1,0µm	1.00µm ±0.05µm	2.7%	5mL	LS0100-05	100 €
			20mL	LS0100-20	205 €
1.5µm	1.45µm ±0.04µm	1.8%	5mL	LS0150-05	100 €
			20mL	LS0150-20	205 €
1.8µm	1.83µm ±0.03µm	1.7%	5mL	LS0170-05	100 €
			20mL	LS0170-20	205 €
2.0µm	2.03µm ±0.06µm	2.1%	5mL	LS0200-05	100 €
			20mL	LS0200-20	205 €
4.0µm	3.77µm ±0.14µm	4.0%	5mL	LS0400-05	100 €
			20mL	LS0400-20	205 €
4.5µm	4.62µm ±0.11µm	2.7%	5mL	LS0450-05	100 €
			20mL	LS0450-20	205 €
5µm	4.88µm ±0.10µm	2.4%	5mL	LS0500-05	110 €
			20mL	LS0500-20	225 €
7µm	6.76µm ±0.08µm	2.8%	5mL	LS0700-05	110 €
			20mL	LS0700-20	225 €
8µm	8.03µm ±0.10µm	3.0%	5mL	LS0800-05	110 €
			20mL	LS0800-20	225 €
9µm	9.33µm ±0.10µm	3.0%	5mL	LS0900-05	110 €
			20mL	LS0900-20	225 €
10µm	9.87µm ±0.12µm	2.4%	5mL	LS1000-05	135 €
			20mL	LS1000-20	305 €
14µm	13.47µm ±0.11µm	2.9%	5mL	LS1400-05	135 €
			20mL	LS1400-20	305 €
20µm	19.55µm ±0.20µm	2.8%	5mL	LS2000-05	135 €
			20mL	LS2000-20	305 €
25µm	25.0 µm ±0.3 µm	2.1%	5mL	LS2500-05	135 €
			20mL	LS2500-20	305 €
27µm	27.0 µm ±0.3 µm	3.8%	5mL	LS2700-05	135 €
			20mL	LS2700-20	305 €
30µm	28.9 µm ±0.4 µm	2.6%	5mL	LS3000-05	135 €
			20mL	LS3000-20	305 €
40µm	40.3 µm ±0.3 µm	2.2%	5mL	LS4000-05	135 €
			20mL	LS4000-20	305 €
50µm	50.4 µm ±0.4 µm	1.9%	5mL	LS5000-05	135 €
			20mL	LS5000-20	305 €
75µm	75.7 µm ±0.5 µm	2.6%	5mL	LS7500-05	135 €
			20mL	LS7500-20	305 €

The particle concentrations of these size standards are adjusted in that way that a few drops only (specified in each certificate) dropped into 20 to 40mL of pure water immediately results in a particle concentration of approx. 3000 to 5000 part./mL which is appropriate for most of the particle counting instruments to avoid coincidence errors. To support this each bottle does have a dropper-tip. The advantage is: no need for diluting the calibrant several times and no waste of "expensive particles".

**This means that laboratory time and money will be saved!**

Each of these standards will be supplied either in a 5mL or a 20mL dropper-tipped-bottle together with a certificate (English language) which contains the particle size distributions as graphs as well.

If an appropriate storage takes place our size calibration standards have a shelf life of three years calculated from date of delivery.

Our Particle Size Standards Sets are useful compilations of the most important calibrants at a reduced price which enables you to generate a complete calibration curve with a minimum of measurements. Each set will be supplied in a stable box with seven 5mL or five 20mL calibrants and all certificates.

### Particle Size Standards - Sets (LS Series)

No.	Cat. Number	Quantity	Price	Nominal Particle Diameters									
				1.0µm	2.0µm	5.0µm	10µm	20µm	25µm	40µm	-----	-----	
1.	LS0100a05	7 x 5ml	660 €	1.0µm	2.0µm	5.0µm	10µm	20µm	25µm	40µm	-----	-----	
2.	LS0200d05	7 x 5ml	690 €	-----	2.0µm	5.0µm	10µm	20µm	25µm	40µm	-----	75µm	
3.	LS0100b20	5 x 20ml	1005 €	1.0µm	2.0µm	5.0µm	10µm	20µm	-----	-----	-----	-----	
4.	LS0200b20	5 x 20ml	1090 €	-----	2.0µm	5.0µm	10µm	20µm	25µm	-----	-----	-----	
5.	LS0500b20	5 x 20ml	1175 €	-----	-----	5.0µm	10µm	20µm	-----	40µm	-----	75µm	

The data of the corresponding single calibration standards are listed in the previous table



## 2. Size Calibration Standards for Particle **SIZING** Instruments (HS Series)

Whereas the particle size standards of the LS series (see page 2) have particularly been designed for particle counters the calibrants of the **HS** series are more suitable for particle sizing instruments; even for those which definitely need higher solids contents of particles (**HS = High Solids content**).

These long-term-stabilized suspensions do possess a high solids content of particles (2% / 3%) which is significantly higher than most of the commercially available size calibrants on the market. Therefore these size standards of 20mL volume are very universally usable.

Like the calibrants of the LS series the size standards of this HS series are also traceable to NIST (*National Institut of Standards and Technology*) and will be supplied with a certificate (English language). It shows the typical particle data and the measured particle size distribution as a graph as well.

If an appropriate storage takes place the size calibration standards have a shelf life of three years calculated from date of delivery.

Nominal Size	Certified Particle Diameter (Mode) $x_v$		Rel. Standard Deviation (C.V.)	Solids Contents	Catalog Number	Price [Euro]
<b>150nm</b>	149nm	±7nm	3.3%	2%	HS0015-20	265 €
<b>180nm</b>	185nm	±5nm	3.0%	2%	HS0018-20	265 €
<b>250nm</b>	251nm	±5nm	3.2%	2%	HS0025-20	265 €
<b>300nm</b>	308nm	±10nm	3.0%	2%	HS0030-20	265 €
<b>400nm</b>	401nm	±9nm	4.7%	2%	HS0040-20	265 €
<b>500nm</b>	519nm	±14nm	1.7%	2%	HS0050-20	265 €
<b>600nm</b>	621nm	±14nm	3.0%	2%	HS0060-20	265 €
<b>700nm</b>	738nm	±14nm	3.7%	2%	HS0070-20	265 €
<b>1.0µm</b>	1.008µm	±0.028µm	2.2%	2%	HS0100-20	310 €
<b>1.5µm</b>	1.543µm	±0.030µm	1.6%	3%	HS0150-20	310 €
<b>2.0µm</b>	2.06µm	±0.07µm	3.8%	2%	HS0200-20	310 €
<b>5µm</b>	5.15µm	±0.06µm	3.0%	3%	HS0500-20	310 €
<b>7µm</b>	7.25µm	±0.08µm	3.0%	3%	HS0700-20	310 €
<b>10µm</b>	10.25µm	±0.09µm	3.1%	3%	HS1000-20	375 €
<b>15µm</b>	15.30µm	±0.10µm	3.3%	3%	HS1500-20	375 €
<b>20µm</b>	20,01µm	±0.35µm	2.9%	3%	HS2000-20	375 €
<b>40µm</b>	38.6µm	±0.4µm	3.9%	3%	HS4000-20	375 €
<b>50µm</b>	52.1µm	±0.4µm	3.7%	3%	HS5000-20	375 €
<b>75µm</b>	75.6µm	±0.4µm	3.2%	2%	HS7500-20	375 €
<b>100µm</b>	97.2µm	±1.0µm	4.1%	2%	HS10000-20	375 €

### 3. Particle Powder Standards (Pu Series)

Particle **Powder** Standards are designed for calibration and validation of those particle sizing instruments which are not capable to detect particles suspended in water (e.g. air born particle counters). These dry particle powders can also be suspended in organic alcohols or acetone without any significant change in size.

Particle Powder Standards are traceable to NIST (*National Institut of Standards and Technology*) and will be supplied as 1.0g or 5.0g quantities with a certificate (English language). The particle data had been determined by re-suspension of multiple powder assays in 0.05% aqueous sodiumdodecylsulfate solution.

If an appropriate storage takes place these standards have a shelf life of five years calculated from date of delivery.

Nominal Size	Certified Particle Diameter (Mode)		Rel. Standard Deviation (C.V.)	Quantity	Catalog Number	Price [Euro]
<b>7µm</b>	6.68µm	±0.08µm	3.5%	1.0g	Pu0700-01	230 €
				5.0g	Pu0700-05	860 €
<b>9µm</b>	8.69µm	±0.12µm	3.5%	1.0g	Pu0900-01	230 €
				5.0g	Pu0900-05	860 €
<b>12µm</b>	12.20µm	±0.20µm	4.4%	1.0g	Pu1200-01	240 €
				5.0g	Pu1200-05	895 €
<b>20µm</b>	20.2 µm	±0.4 µm	3.8%	1.0g	Pu2000-01	240 €
				5.0g	Pu2000-05	895 €
<b>40µm</b>	37.2 µm	±0.5 µm	2.0%	1.0g	Pu4000-01	240 €
				5.0g	Pu4000-05	895 €
<b>80µm</b>	79.7 µm	±0.5 µm	2.1%	1.0g	Pu8000-01	240 €
				5.0g	Pu8000-05	895 €

#### 4. Test Particles (Te Series)

Test Particles are suspensions of particles for conducting universal particle experiments or measurements which do need very high solids content but which do not need such a narrow particle size distribution like the calibrants of the series LS, HS or Pu.

These are their benefits: They are aqueous, long-term-stabilized suspensions with 5% solids content of particles and they possess more product volume (25mL instead of 20mL) and are significantly cheaper than the calibrants of the LS, HS or Pu series additionally.

Nevertheless the particle size distribution is relatively narrow. The relative standard deviations (CV values) of the mean particle diameters are smaller than 10%!

Even though no certificate will be shipped all important physical particle data of each lot can be downloaded from our website <http://www.BS-Partikel.de/DEUT/teli.htm> as a PDF file at any time. These information also include the measured differential and cumulative particle size distributions as graphs. If an appropriate storage takes place the calibration standards have a shelf life of three years calculated from date of delivery.

Nominal Size	Most Frequent Particle Diameter $x_v$	Relative Std.Dev. (C.V.)	Characterized Measurement Range	Solids Contents	Quantity	Catalog Number	Price [Euro]
<b>0,7<math>\mu</math>m</b>	0.71 $\mu$ m $\pm$ 0.02 $\mu$ m	< 8%	0.4 $\mu$ m - 10.0 $\mu$ m	5%	25ml	Te0070-25	140 €
<b>1<math>\mu</math>m</b>	1.00 $\mu$ m $\pm$ 0.06 $\mu$ m	8.4%	0.4 $\mu$ m - 18.8 $\mu$ m	5%	25ml	Te0100-25	160 €
<b>4<math>\mu</math>m</b>	4.2 $\mu$ m $\pm$ 0.2 $\mu$ m	< 7%	1.0 $\mu$ m - 30.0 $\mu$ m	5%	25mL	Te0400-25	160 €
<b>7<math>\mu</math>m</b>	6.5 $\mu$ m $\pm$ 0.2 $\mu$ m	4.9%	4.0 $\mu$ m - 80.2 $\mu$ m	5%	25mL	Te0700-25	160 €
<b>10<math>\mu</math>m</b>	9.5 $\mu$ m $\pm$ 0.2 $\mu$ m	< 6%	1.0 $\mu$ m - 52.0 $\mu$ m	5%	25mL	Te1000-25	195 €
<b>15<math>\mu</math>m</b>	15.3 $\mu$ m $\pm$ 0.3 $\mu$ m	5.0%	1.0 $\mu$ m - 98.5 $\mu$ m	5%	25mL	Te1500-25	195 €
<b>30<math>\mu</math>m</b>	31.7 $\mu$ m $\pm$ 0.5 $\mu$ m	5.1%	4.0 $\mu$ m - 100.5 $\mu$ m	5%	25ml	Te3000-25	240 €

Please note that Test Particles are **not** designed for size calibration.

We recommend our NIST traceable calibration standards (Series LS or HS) instead.

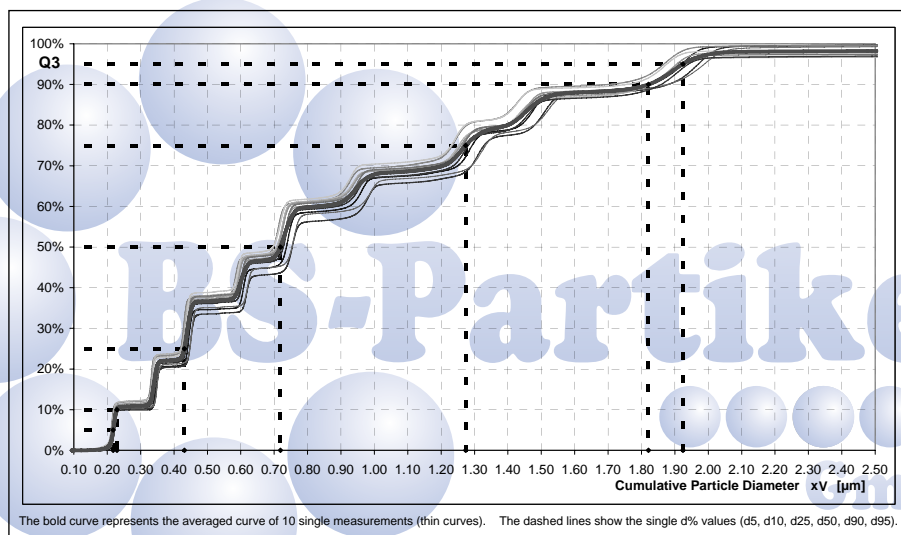




## 5. Multi-Size Standards (MS Series)

**Multi-Size-Standards are aqueous surfactants-stabilized mixtures of manyfold particle size standards which have been analyzed very accurately due to their cumulative volume weighted particle size distribution Q3(x). The results are documented in an accompanying certificate.**

In opposite to single particle size/calibration standards they enable to study processes in which the particle size distribution situation could change. E.g. investigations of the quality of filter aids (syringe filter, membranes,...), because the particle size distribution will be different between what you put onto the filter aid and the filtrate. In the accompanying certificate the typical numerical data like d5, d10, d25, d50, d75, d90, d95 (d%) are listed as well as a graph which shows the complete cumulative size distribution. It also can be downloaded from our website <http://www.http://www.BS-Partikel.de/DEUT/msli.htm> as a PDF file.



The 5ml or 20mL dropper-tipped-bottles containing a magnetic stir bar for easy homogenization. Each bottle comes with a certificate. The documented shelf life is 2 years **from date of delivery**.

Size Range	Solids Contents	Quantity	Catalog Number	Price
<b>0,2 µm - 2 µm</b>	2%	5 mL	MS0002-05	195 €
		20 mL	MS0002-20	395 €
<b>1,0 µm - 10 µm</b>	2%	5 mL	HS0110-05	195 €
		20 mL	HS0110-20	395 €

## 6. Particle Count Standard Kits and Sets (PC Series)

Particle **Count** Standard Kits are designed to quickly check particle counters with respect to their counting accuracy with a minimum of efforts.

Being able to do so each kit consists of a bottle with 25mL aqueous suspension of particles of a accurately defined size and particle concentration (nom. 3000 particles/mL), a magnetic stir bar and a second Blank bottle (25mL) and a certificate which contains all important particle data.

The procedure to conduct the test is simple because the kit will be applied without any sample preparation ("*ready-to-use suspension*"):

Using the Blank sample first the particle counter will be checked whether it is really particle free. Then the main particle countings will be performed with the particle suspension. Four consecutive measurements of 5mL each will be done whereas the first counting result will be discarded (*sensor equilibration*) and the next three counting results will be averaged and compared with the value of the certificate.

The new improved generation of Particle Count Standard Kits with nom. 3000 part./mL achieve with four counting measurements only a higher reproducibility as before. The included magnetic stir bar also supports a more homogenous suspension during measurement.

The accompanying certificate has been improved and gives a detailed application description. It also possesses the "Result Record Form" into which the counting results can be recorded manually to document and to file the counting accuracy of the particle counter.

To eliminate contamination and to increase count accuracy and reproducibility one kit is necessary to check one particle counter (*single-use product*). The well-priced set contains 3 kits of the same particle size and concentration in a stable box.

If an appropriate storage takes place the Particle Count Standards Kits and Sets have a shelf life of two years calculated from date of delivery.

Nominal Particle Size	Nominal Particle Concentration	Most Frequent Particle Diameter $x_N$		Certified Particle Concentration in Measurement Range [Part./ml]		Measurement Range	Quantity	Kit or Set		Price [Euro]
								Kit or Set	Catalog Number	
10µm	3000 Part./mL	10.2µm	±0.2µm	3050	±50 (1.6%)	7.0µm - 12.0µm	25mL	Kit	PC1003-25	75 €
								Set (= 3 Kits)	PC1003a25	180 €
25µm	3000 Part./mL	26.9µm	±0.5µm	3010	±40 (1.3%)	20.0µm - 30.0µm	25mL	Kit	PC2503-25	75 €
								Set (= 3 Kits)	PC2503a25	180 €
40µm	3000 Part./mL	40.0µm	±0.5µm	3020	±60 (2.0%)	30.0µm - 50.0µm	25mL	Kit	PC4003-25	75 €
								Set (= 3 Kits)	PC4003a25	180 €
70µm	3000 Part./mL	64.8µm	±1.0µm	3010	±60 (2.0%)	50.0µm - 80.0µm	25mL	Kit	PC7003-25	75 €
								Set (= 3 Kits)	PC7003a25	180 €

Particle **Count** Standard Kits or Sets are not designed for size calibration! We recommend our Particle **Size** Standards (**LS Series**) instead!

## 7. PharmaCount1510 Standard - Kit and Set (Ph Series)

The **PharmaCount1510** Standard-Kit is ideal to perform a quick and accurate **interim** verification of a particle counting instrument with respect to PharmEur and USP chapter <788>/<1788> (*Light Obscuration Particle Count Test*).

Just as the Particle Count Standard Kit the PharmaCount1510 Standard - Kit will be applied without any sample preparation (*ready-to-use*) directly. The kit also contains a 25mL Blank sample, a 25mL particle suspension of a well defined size and concentration with a magnetic stir bar and a certificate.

The counting accuracy test will follow the rules of the USP/PharmEur regulations (see above): Using the Blank sample first the particle counter will be checked whether it is really particle free by four consecutive count measurements. Then the main particle countings will be performed with the particle suspension. Four consecutive measurements of 5mL each will be done whereas the first counting result has to be discarded (*sensor equilibration*) and the next three counting results will be averaged and compared with the specification range of the certificate.

All measured particle countings and some other important data (e.g. operator name, device number, etc.) should be recorded in the so called Result Record Form of the accompanying certificate to document and file the count accuracy result of your particle counter.

To eliminate contamination and to increase count accuracy and reproducibility one kit is necessary to check one particle counter (*single-use product*). Alternately to the single Kit there is a cost effective Set which consists of 3 Kits packaged in a stable box. If an appropriate storage takes place PharmaCount1510 Standard - Kits/Sets have a shelf life of two years calculated from date of delivery.

Nominal Particle Concentration	Certified Particle Concentration PharmaCount1510 [Part./ml]	Certified Ratio of Particle Concentrations	Blank [Part./ml]	Type	Catalog Number	Price [Euro]
$N_{10\mu} \geq 10\mu$	$N_{10\mu} \geq 10\mu$	$N_{10\mu} / N_{15\mu}$	$N_{10\mu} \geq 10\mu$			
3800 Part./ml	3330 - 4110	1.78 - 2.57	<10	Kit	Ph1510-25	90 €
				Set = 3 Kits	Ph1510a25	195 €



## 8. ISO-MTD2.8-Test Standard (Oi Series)

Applying ISO-MTD2.8-Teststandard the counting accuracy of oil particle counters can be validated e.g. following the regulations of ISO 4406.

The ISO-MTD2.8-Teststandard contains the official ISO MTD particles (*ISO Medium Test Dust*) suspended in an ultraclean hydraulic oil.

The number of particles will cumulatively be counted into 5 channels  $\geq 4\mu\text{m}$ ,  $\geq 6\mu\text{m}$ ,  $\geq 14\mu\text{m}$ , ( $\geq 25\mu\text{m}$ ,  $\geq 50\mu\text{m}$ ) and compared with the specified values. For evaluation the number averages of the first three channels should be used.

The measured single and average values of the single channels should be noted in the so called Result Record Form of the accompanying certificate. You should file it with the QC documents of the examined particle counter which means you have a proof of the qualification of this device.

Particle Concentration [Part./10mL]						Cat. Number (200mL Bottle)	Price [Euro]
$N_{4\mu} \geq 4\mu\text{m}$		$N_{6\mu} \geq 6\mu\text{m}$		$N_{14\mu} \geq 14\mu\text{m}$			
Nom.	Specif.	Nom.	Specif.	Nom.	Specif.		
61000	60990	24000	23910	1700	1720	Oi0028-200	280.00

Included in delivery is a bottle with 200mL of ISO-MTD2.8-Teststandard and the certificate which includes a description of the application method and the Result Record Form.

The shelf life is three years with respect to the date of delivery.

## **Working on Commissions**

### **9. USP Calibrations for SYRINGE - Particle Counter**

On request BS-Partikel calibrates SYRINGE particle counters of Markus Klotz GmbH, Bad Liebenzell, Germany according to der regulations of USP <788>/<1788>.

To fulfill these requirements for each particle sizing instrument a 9-point-size calibration with NIST-traceable particle size standards will be accomplished, its noise limit, the precision of 2mL, 5mL, 7mL and 10mL volume determination and the corresponding linearity, the precision of flow rate, the sensor resolution and the counting accuracy using the original USP Particle Count Reference Standard Set will be determined, documented and certified.

We currently carry out this service for several big pharmaceutical companies in Germany's Rhein-Main area. To receive more information about this service please contact us by email [support@BS-Partikel.de](mailto:support@BS-Partikel.de) or by phone ++49 / 611 / 7-888-999.

### **10. Contract Syntheses of Monodisperse Polystyrene Particles**

BS-Partikel also conducts contract manufacturing of particle syntheses for you. For at least 30g solids content we produce monodisperse suspensions or powders of polystyrene particles of well defined particle diameters.

Appr. 8 weeks after your order you will receive the product with an accompanying certificate of the lot. Please contact us for an [offer](#).

### **11. Contract Analyses of Particle Size Distributions / Particle Countings**

BS-Partikel also conducts measurements of particle size distributions or particle countings of aqueous or alcoholic suspensions according to your wishes.

Additional information and some interesting examples of particle analyses can be seen on our website <http://www.BS-Partikel.de/ENGL/analyt.htm> immediately.

Please contact us by phone ++49 / 611 / 7-888-999 to discuss the results you expect by the analyses. We then give you an obligatory offer.

## Particle Products of other Manufacturers

We are offering particle (standards) of other manufacturer in addition to our particle product lines. They come from microParticles, Germany, from Thermo Fisher Scientific, USA (who bought Duke Scientific Corp.) and Dr.Lerche (Germany).

A lot of Thermo's nano- and micro-sized particle standards we already tested several times and they are comparable to ours as qualified size standards. We therefore really recommend them as a completion to ours explicitly!

### Please note that .....

- ..... the described product properties could change slightly if a new lot will be produced by the manufacturer to substitute the sold-out product.
- ..... the delivery time takes approx. 14 days. In case of a purchase order we **definitely** return an order confirmation containing a shipping date either by fax or by email in any case.
- ..... **The prices of the other manufacturers are open offers.** If these manufacturers will change there prices we are forced to fit the prices which are listed on page 12 to 19 immediately. So, if you want to play safe please ask us for a quotation.

**You didn't find your Desired Particles or Particle Standards ?**

**Then please contact us:**

by phone: **++49 / 611 / 7-888-999**  
or  
by email: [support@bs-partikel.de](mailto:support@bs-partikel.de)

## Nano-sized Particle Size Standards (Thermo Fisher Scientific, prev. Duke Scientific)

### Monodisperse, spherical polystyrene particles in aqueous suspension (Latex)

Catalog Number	Nom. Diameter	Current Diameter	Rel. Standard Deviation (CV)	Content of Particles
3020A	20 nm	23 nm ± 2 nm	Not determined	1%
3030A	30 nm	33 nm ± 1.4 nm	Not determined	1%
3040A	40 nm	41 nm ± 4 nm	Not determined	1%
3050A	50 nm	46 nm ± 2 nm	15.8%	1%
3060A	60 nm	57 nm ± 4 nm	19.1%	1%
3070A	70 nm	70 nm ± 3 nm	10.4%	1%
3080A	80 nm	81 nm ± 3 nm	11.7%	1%
3090A	90 nm	92 nm ± 3 nm	7.6%	1%
3100A	100 nm	100 nm ± 3 nm	7.8%	1%
3125A	125 nm	125 nm ± 4 nm	4.3%	1%
3150A	150 nm	151 nm ± 4 nm	3.4%	1%
3200A	200 nm	203 nm ± 5 nm	2.3%	1%
3220A	220 nm	220 nm ± 6 nm	2.1%	1%
3240A	240 nm	240 nm ± 6 nm	1.5%	1%
3269A	270 nm	269 nm ± 6 nm	1.6%	1%
3300A	300 nm	296 nm ± 6 nm	1.8%	1%
3350A	350 nm	350 nm ± 7 nm	1.3%	1%
3400A	400 nm	400 nm ± 5 nm	1.8%	1%
3450A	450 nm	453 nm ± 4 nm	1.4%	1%
3495A	500 nm	491 nm ± 4 nm	1.3%	1%
3500A	500 nm	498 nm ± 5 nm	1.6%	1%
3560A	560 nm	565 nm ± 6 nm	1.5%	1%
3600A	600 nm	596 nm ± 6 nm	1.3%	1%
3700A	700 nm	702 nm ± 6 nm	0.7%	1%
3800A	800 nm	799 nm ± 9 nm	1.0%	1%
3900A	900 nm	903 nm ± 9 nm	1.0%	1%

Diameters has been determined either by Transmission Electron Microscopy (TEM) or by Photon Correlation Spectroscopy (PCS). The data listed as "Current Diameter" and "Standard Deviation" are numbers for better orientation; they will change slightly if a new lot will be manufactured. Therefore these data are not guaranteed !

- These nano-sized particle size standards are mainly designed to calibrate particle sizing and particle counting systems but can also be used for other purposes.
- All particle size standards are traceable to NIST (*National Inst. of Standards and Technology*) and will be shipped with an English certificate of the manufacturer.
- Alle size standards will be supplied as stabilized aqueous suspensions in 15mL dropper-tipped bottles.
- **Price: 395.- Euro / 15 mL**

## Micro-sized Particle Size Standards (Thermo Fisher Scientific, prev. Duke Scientific)

### Spherical polystyrene particles as suspensions (Latex), above 160µm as powders

Catalog Number	Nom. Diameter	Current Diameter	Rel. Standard Deviation (CV)	Content of Particles
4009A	1.0 µm	0.994 µm ± 0.021 µm	1.0%	1.0%
4010A	1.0 µm	1.019 µm ± 0.015 µm	1.0%	1.0%
4011A	1.1 µm	1.101 µm ± 0.023 µm	1.1%	1.0%
4013A	1.3 µm	1.361 µm ± 0.024 µm	1.5%	1.0%
4016A	1.6 µm	1.587 µm ± 0.025 µm	1.3%	1.0%
4018A	1.8 µm	1.745 µm ± 0.025 µm	1.1%	1.0%
4202A	2.0 µm	2.020 µm ± 0.015 µm	1.0%	0.5%
4025A	2.5 µm	2.504 µm ± 0.025 µm	1.0%	0.5%
4203A	3.0 µm	3.005 µm ± 0.027 µm	1.1%	0.5%
4204A	4.0 µm	4.000 µm ± 0.033 µm	1.0%	0.4%
4205A	5.0 µm	4.993 µm ± 0.040 µm	1.0%	0.3%
4206A	6.0 µm	5.990 µm ± 0.045 µm	1.2%	0.3%
4207A	7.0 µm	7.028 µm ± 0.055 µm	1.0%	0.3%
4208A	8.0 µm	7.979 µm ± 0.055 µm	1.1%	0.3%
4209A	9.0 µm	8.956 µm ± 0.056 µm	1.0%	0.3%
4210A	10 µm	10.12 µm ± 0.06 µm	0.9%	0.2%
4212A	12 µm	12.01 µm ± 0.07 µm	1.0%	0.2%
4215A	15 µm	14.97 µm ± 0.10 µm	0.9%	0.3%
4220A	20 µm	20.00 µm ± 0.10 µm	1.0%	0.3%
4225A	25 µm	24.61 µm ± 0.22 µm	1.1%	0.5%
4230A	30 µm	30.10 µm ± 0.22 µm	1.5%	0.6%
4240A	40 µm	39.94 µm ± 0.35 µm	1.3%	0.7%
4250A	50 µm	50.2 µm ± 1.0 µm	1.0%	1.4%
4260A	60 µm	58.6 µm ± 0.8 µm	1.4%	1.1%
4270A	70 µm	72.3 µm ± 0.9 µm	1.2%	2.0%
4280A	80 µm	79.8 µm ± 1.2 µm	1.1%	1.8%
4310A	100 µm	100 µm ± 1.5 µm	1.6%	2.2%
4311A	115 µm	113 µm ± 1.6 µm	1.4%	2.6%
4314A	140 µm	138 µm ± 2.8 µm	2.0%	4.1%
4316A	160 µm	158 µm ± 2.2 µm	2.2%	4.8%
4320A	200 µm (Powder)	198 µm ± 3.3 µm	3.2%	2.3 x 10 <sup>5</sup> Part./g
4324A	240 µm (Powder)	233 µm ± 4.0 µm	4.5%	1.4 x 10 <sup>5</sup> Part./g
4328A	280 µm (Powder)	279 µm ± 5.6 µm	4.8%	8.3 x 10 <sup>4</sup> Part./g
4330A	300 µm (Powder)	300 µm ± 6.0 µm	4.0%	6.7 x 10 <sup>4</sup> Part./g
4340A	400 µm (Powder)	398 µm ± 8.0 µm	3.4%	2.9 x 10 <sup>4</sup> Part./g
4350A	500 µm (Powder)	494 µm ± 10 µm	5.1%	1.5 x 10 <sup>4</sup> Part./g
4355A	550 µm (Powder)	552 µm ± 11 µm	4.9%	1.1 x 10 <sup>4</sup> Part./g
4365A	650 µm (Powder)	644 µm ± 13 µm	3.9%	6.8 x 10 <sup>3</sup> Part./g
4375A	750 µm (Powder)	773 µm ± 15 µm	4.3%	3.9 x 10 <sup>3</sup> Part./g
4400A	1000 µm (Powder)	1007 µm ± 20 µm	4.8%	1.8 x 10 <sup>3</sup> Part./g

- These nano-sized particle size standards are mainly designed to calibrate particle sizing and particle counting systems but can also be used for other purposes.
- All particle size standards are traceable to NIST (*National Inst. of Standards and Technology*) and will be shipped with an English certificate of the manufacturer.
- The size standards will be supplied as stabilized aqueous suspensions in 15mL dropper-tipped bottles. If their diameters are 200µm or greater they will delivered as dry powders in 1.0 gram quantities.

**Price: 495.- Euro / 15 mL or 1.0 g**



## Micro-sized Glass Size Standards (Thermo Fisher Scientific, prev. Duke Scientific)

Spherical glass particle made of borosilicate glass<sup>1)</sup> or soda lime

Catalog Number	Nom. Diameter	Current Diameter	Rel. Standard Deviation (CV)	Particles/Gram
9002 <sup>1)</sup>	2 µm	2.0 µm ± 0.5µm	35%	9.5 x 10 <sup>10</sup>
9005 <sup>1)</sup>	5 µm	5.4 µm ± 0.3 µm	13%	4.4 x 10 <sup>9</sup>
9008 <sup>1)</sup>	8 µm	8.0 µm ± 0.8 µm	13%	1.5 x 10 <sup>9</sup>
9010 <sup>1)</sup>	10 µm	10.0 µm ± 1.0 µm	11%	8.5 x 10 <sup>8</sup>
9015 <sup>1)</sup>	15 µm	14.1 µm ± 1.0 µm	10%	2.7 x 10 <sup>8</sup>
9020 <sup>1)</sup>	20 µm	18.2 µm ± 1.0 µm	10%	1.5 x 10 <sup>8</sup>
9030	30 µm	30.1 µm ± 2.1 µm	7.6%	2.9 x 10 <sup>7</sup>
9040	40 µm	40.6 µm ± 2.8 µm	5.4%	1.1 x 10 <sup>7</sup>
9050	50 µm	49.0 µm ± 1.4 µm	4.9%	6.3 x 10 <sup>6</sup>
9060	60 µm	60.0 µm ± 3.6 µm	3.8%	3.6 x 10 <sup>6</sup>
9070	70 µm	72.6 µm ± 4.4 µm	3.7%	2.1 x 10 <sup>6</sup>
9080	80 µm	79.1 µm ± 4.0 µm	3.5%	1.6 x 10 <sup>6</sup>
9090	90 µm	90.3 µm ± 4.5 µm	4.3%	1.1 x 10 <sup>6</sup>
9100	100 µm	100 µm ± 1.6 µm	3.4%	8.3 x 10 <sup>5</sup>
9110	110 µm	111 µm ± 5.5 µm	3.8%	5.8 x 10 <sup>5</sup>
9120	120 µm	120 µm ± 6.0 µm	4.3%	4.5 x 10 <sup>5</sup>
9140	140 µm	139 µm ± 7.0 µm	2.1%	2.9 x 10 <sup>5</sup>
9170	170 µm	167 µm ± 8.4 µm	3.8%	1.6 x 10 <sup>5</sup>
9200	200 µm	202 µm ± 3.8 µm	4.9%	1.0 x 10 <sup>5</sup>
9230	230 µm	231 µm ± 6.9 µm	3.9%	6.2 x 10 <sup>4</sup>
9280	280 µm	279 µm ± 8.4 µm	3.3%	3.5 x 10 <sup>4</sup>
9330	330 µm	324 µm ± 10 µm	4.9%	2.2 x 10 <sup>4</sup>
9400	400 µm	391 µm ± 12 µm	2.6%	1.3 x 10 <sup>4</sup>
9480	480 µm	480 µm ± 14 µm	3.7%	7.1 x 10 <sup>3</sup>
9550	550 µm	553 µm ± 12 µm	5.2%	4600
9650	650 µm	655 µm ± 20 µm	4.4%	2800
9750	750 µm	749 µm ± 22 µm	2.6%	1825
9950	950 µm	940 µm ± 28 µm	4.2%	950
91000	1000 µm	1106 µm ± 33 µm	2.6%	560
92000	2000 µm	2007 µm ± 13 µm	2.5%	95

<sup>1)</sup> These products consist of boro silicate glass, all others are made of soda-lime glass. All Particle Diameters had been determined by Optical Microscopy. The data listed as "Current Diameter" and "Standard Deviation" are numbers for better orientation; they will change slightly if a new lot will be manufactured. Therefore these data are not guaranteed !

- These standards contain no broken or non-spherical, but spherical glass beads only!
- All particle size standards are traceable to NIST (*National Inst. of Standards and Technology*) and will be shipped with an English certificate of the manufacturer.
- The glass particle standards (density: 2.53 g/mL) will be shipped as "powder" in 1.0g quantities.
- **Prices: 385.- Euro (< 30µm) / 340.- Euro (≥ 30µm)**

## Micro-sized Silica Size Standards

(Thermo Fisher Scientific, prev. Duke Scientific)

### Spherical, monodisperse, silica particles with certificate traceable to NIST

Catalog Number	Nom. Diameter	Current Diameter	Rel. Standard Deviation (CV)	Content of Particles	Price 15ml
8050	0.5 µm	0.49 µm ± 0.02µm	4.1%	2%	325 €
8070	0.7 µm	0.73 µm ± 0.02µm	4.1%	2%	325 €
8100 <sup>1)</sup>	1.0 µm	0.99 µm ± 0.02µm	2.0%	2%	325 €
8150 <sup>1)</sup>	1.6 µm	1.57 µm ± 0.02µm	2.5%	2%	325 €

<sup>1)</sup> Determined by Optical Microscopy.; all other Particle Diameters had been determined by Transmission Electron Microscopy (TEM). The data listed as "Current Diameter" and "Standard Deviation" are numbers for better orientation; they will change slightly if a new lot will be manufactured. Therefore these data are not guaranteed !

- These monodisperse silica particle standards do have a higher density (2.0 g/mL) than polystyrene particles (Latex) and show a higher optical contrast than these.
- These particle size standards are traceable to NIST (*National Inst. of Standards and Technology*) and will be shipped with an English certificate of the manufacturer.
- The silica particle standards will be shipped in ultra pure water without any surfactant bottled in 15mL dropper-tipped bottles.
- **Price: 340.- Euro / 15 mL**

## Micro-sized Silica - Size Standards

(microParticles)

### Spherical, monodisperse, silica particles without certificate

Catalog Number	Nom. Diameter	Current Diameter <sup>1)</sup>	Rel. Standard Deviation <sup>1)</sup> (CV)	Content of Particles	Price 10ml	Price 15ml
SiO <sub>2</sub> -F-0.25-84	0.25 µm	0.255 µm	5.5%	5%	142 €	179 €
SiO <sub>2</sub> -F-0.35-31	0.35 µm	0.353 µm	4.3%			
SiO <sub>2</sub> -F-0.4-32	0.40 µm	0.387 µm	0.03			
SiO <sub>2</sub> -F-0.5-72	0.50 µm	0.500 µm	2.6%			
SiO <sub>2</sub> -F-0.75-46	0.75 µm	0.755 µm	3.3%			
SiO <sub>2</sub> -F-0.8-02	0.80 µm	0.798 µm	3.4%			
SiO <sub>2</sub> -F-1.0-02	1.00 µm	0.977 µm	2.7%	5%	160 €	202 €
SiO <sub>2</sub> -F-1.5-80	1.5 µm	1.55 µm	2.3%			
SiO <sub>2</sub> -F-2.0-61	2.0 µm	2.06 µm	2.2%			
SiO <sub>2</sub> -F-3.0-96	3.0 µm	2.80 µm	2.2%	5%	175 €	220 €
SiO <sub>2</sub> -F-4.0-90	4.0 µm	3.92 µm	4.8%			
SiO <sub>2</sub> -F-4.5-76	4.5 µm	4.62 µm	4.3%			
SiO <sub>2</sub> -F-5.0-59	5.0 µm	5.04 µm	3.9%			
SiO <sub>2</sub> -F-6.5-01	6.5 µm	6.65 µm	4.2%			
SiO <sub>2</sub> -F-14.0-19	14 µm	13.79 µm	4.3%			
SiO <sub>2</sub> -F-15.0-19	15 µm	15.29 µm	3.2%	5%	250 €	305 €
SiO <sub>2</sub> -F-19.5-19	19.5 µm	19.59 µm	3.8%			
SiO <sub>2</sub> -F-22.0-19	22 µm	21.18 µm	4.0%			

<sup>1)</sup> Determined by analytical disc centrifuge respectively Coulter Counter™. The data listed as "Current Diameter" and "Standard Deviation" are numbers for better orientation; they will change slightly if a new lot will be manufactured. Therefore these data are not guaranteed !

## ChromoSpheres™

(Thermo Fisher Scientific, previous Duke Scientific)

Spherical polystyrene-DVB particles as powders with certificate, NIST traceable

Catalog Number	Color	Nom. Diameter	Current Diameter	Rel. Standard Deviation (CV)	Number of Particles per Gram	Price 1.0 gram
RD050T	Red	50 µm	48.6 µm ± 2.9 µm	7.5%	1.6 x 10 <sup>7</sup>	740 €
BK050T	Black	50 µm	49.4 µm ± 2.9 µm	7.4%	1.5 x 10 <sup>7</sup>	
RD100T	Red	100 µm	93.4 µm ± 6.3 µm	8.6%	2.2 x 10 <sup>6</sup>	
BK100T	Black	100 µm	96.4 µm ± 6.2 µm	8.6%	2.0 x 10 <sup>6</sup>	
RD150T	Red	150 µm	149 µm ± 6.8 µm	6.0%	5.4 x 10 <sup>5</sup>	
BK150T	Black	150 µm	148 µm ± 7.7 µm	7.1%	5.6 x 10 <sup>5</sup>	
RD200T	Red	200 µm	202 µm ± 7.1 µm	4.7%	2.2 x 10 <sup>5</sup>	
BK200T	Black	200 µm	200 µm ± 7.5 µm	5.5%	2.3 x 10 <sup>5</sup>	
RD300T	Red	300 µm	301 µm ± 7.5 µm	3.3%	6.6 x 10 <sup>4</sup>	
BK300T	Black	300 µm	301 µm ± 7.8 µm	3.3%	6.6 x 10 <sup>4</sup>	
RD400T	Red	400 µm	402 µm ± 14 µm	4.5%	2.8 x 10 <sup>4</sup>	
BK400T	Black	400 µm	402 µm ± 14 µm	4.5%	2.8 x 10 <sup>4</sup>	
RD500T	Red	500 µm	500 µm ± 19 µm	4.8%	1.4 x 10 <sup>4</sup>	
BK500T	Black	500 µm	502 µm ± 19 µm	4.8%	1.4 x 10 <sup>4</sup>	

All Particle Diameters had been determined by Optical Microscopy. The data listed as "Current Diameter" and "Standard Deviation" are numbers for better orientation; they will change slightly if a new lot will be manufactured. Therefore these data are not guaranteed !

## Dyed Particle Size Standards

(microParticles)

Spherical polystyrene-DVB particles as suspensions without certificate



Catalog Number	Color	Nom. Diameter	Current Diameter <sup>1)</sup>	Relative Standard Deviation <sup>1)</sup> (CV)	Content of Particles	Price 10mL	Price 15mL
PS-Blau-1.0-64	Blue	1.0 µm	1.21 µm	3.1%	5%	240 €	278 €
PS-Rot-2.0-56	Red	2.0 µm	2.21 µm	1.3%			
PS-Blau-2.0-51	Blue	2.0 µm	1.94 µm	2.0%			
PS-Blau-4.0-34	Blue	4.0 µm	4.21 µm	2.6%			
PS-Rot-5.0-01	Red	5.0 µm	5.21 µm	2.8%			
PS-Blau-5.0-06	Blue	5.0 µm	5.21 µm	1.5%			
PS-Rot-10.0-21	Red	10 µm	9.78 µm	1.2%			
PS-Blau-9.5-07	Blue	10 µm	9.55 µm	0.9%	5%	265 €	307 €
PS-Rot-12.5-53	Red	12 µm	12.48 µm	0.9%			
PS-Blau-12.5-50	Blue	12 µm	12.45 µm	0.9%			
PS-Rot-20.0-58	Red	20 µm	19.9 µm	0.8%			
PS-Blau-20.0-37	Blue	20 µm	19.98 µm	0.9%			
PS-Blau-26.5-26	Blue	26 µm	26.37 µm	1.9%			
PS-Rot-31.0-54	Red	31 µm	30.93 µm	1.2%			
PS-Blau-32.0-28	Blue	32 µm	32.20 µm	1.9%			
PS-Rot-41.0-17	Red	41 µm	41.11 µm	1.2%			
PS-Blau-41.5-38	Blue	42 µm	41.68 µm	1.0%			
PS-Blau-52.0-76	Blue	52 µm	52.22 µm	1.1%			
PS-Blau-60.0-39	Blue	60 µm	59.70 µm	1.5%			
PS-Rot-80.0-69	Red	80 µm	78.92 µm	1.3%			
PS-Blau-80.0-68	Blue	80 µm	79.10 µm	1.8%			
PS-Rot-100.0-98	Red	100 µm	99 µm	1.2%			
PS-Rot-110.0-42	Red	110 µm	106 µm	1.8%	5%	330 €	385 €
PS-Blau-110.0-43	Blue	110 µm	107 µm	1.6%			

<sup>1)</sup> Determined by optical microscopy respectively Coulter Counter™.

The data listed as "Current Diameter" and "Standard Deviation" are numbers for better orientation; they will change slightly if a new lot will be manufactured. Therefore these data are not guaranteed !

## Fluorescent Particles

(Thermo Fisher Scientific, prev. Duke Scientific)

### Spherical polystyrene particles as suspensions (Latex) or powders

Nom. Diameter	Green Fluorescence				Red Fluorescence				Blue Fluorescence			
	Volume	Catalog Number	Volume	Catalog Number	Volume	Catalog Number	Volume	Catalog Number	Volume	Catalog Number	Volume	Catalog Number
0.03 µm	15 mL	G25	90 mL	G25B	15 mL	R25	90 mL	R25B				
0.04 µm	15 mL	G40	90 mL	G40B								
0.05 µm	15 mL	G50	90 mL	G50B	15 mL	R50	90 mL	R50B	15 mL	B50	90 mL	B50B
0.06 µm					15 mL	R60	90 mL	R60B				
0.07 µm	15 mL	G75	90 mL	G75B								
0.09 µm	15 mL	G85	90 mL	G85B								
0.10 µm	15 mL	G100	90 mL	G100B	15 mL	R100	90 mL	R100B	15 mL	B100	90 mL	B100B
0.14 µm	15 mL	G140	90 mL	G140B					15 mL	B140	90 mL	B140B
0.15 µm									15 mL	B150	90 mL	B150B
0.16 µm					15 mL	R160	90 mL	R160B				
0.20 µm	15 mL	G200	90 mL	G200B	15 mL	R200	90 mL	R200B	15 mL	B200	90 mL	B200B
0.25 µm	15 mL	G250	90 mL	G250B								
0.30 µm	15 mL	G300	90 mL	G300B	15 mL	R300	90 mL	R300B	15 mL	B300	90 mL	B300B
0.40 µm	15 mL	G400	90 mL	G400B	15 mL	R400	90 mL	R400B	15 mL	B400	90 mL	B400B
0.45 µm	15 mL	G450	90 mL	G450B	15 mL	R450	90 mL	R450B				
0.50 µm	15 mL	G500	90 mL	G500B	15 mL	R500	90 mL	R500B	15 mL	B500	90 mL	B500B
0.52 µm									15 mL	B520	90 mL	B520B
0.60 µm	15 mL	G600	90 mL	G600B	15 mL	R600	90 mL	R600B	15 mL	B600	90 mL	B600B
0.70 µm	15 mL	G700	90 mL	G700B	15 mL	R700	90 mL	R700B	15 mL	B700	90 mL	B700B
0.80 µm					15 mL	R800	90 mL	R800B				
0.83 µm	15 mL	G830	90 mL	G830B	15 mL	R830	90 mL	R830B				
0.90 µm	15 mL	G900	90 mL	G900B	15 mL	R900	90 mL	R900B	15 mL	B900	90 mL	B900B
1 µm	10 mL	G0100	60 mL	G0100	10 mL	R0100	60 mL	R0100B	10 mL	B0100	60 mL	B0100B
2 µm	10 mL	G0200	60 mL	G0200	10 mL	R0200	60 mL	R0200B	10 mL	B0200	60 mL	B0200B
2 µm	10 mL	G0220	60 mL	G0220								
3 µm	10 mL	G0300	60 mL	G0300	10 mL	R0300	60 mL	R0300B				
5 µm	10 mL	G0500	60 mL	G0500								
10 µm	10 mL	G1000	60 mL	G1000								
5 µm	1 g	35-2	5 g	35-2B	1 g	36-2	5 g	36-2B				
10 µm	1 g	35-3	5 g	35-3B	1 g	36-3	5 g	36-3B				
15 µm	1 g	35-4	5 g	35-4B	1 g	36-4	5 g	36-4B				
25 µm	1 g	35-5	5 g	35-5B	1 g	36-5	5 g	36-5B				
30 µm	1 g	35-6	5 g	35-6B	1 g	36-6	5 g	36-6B				
40 µm	1 g	35-7	5 g	35-7B	1 g	36-7	5 g	36-7B				
50 µm	1 g	35-8	5 g	35-8B	1 g	36-8	5 g	36-8B				
70 µm	1 g	35-9	5 g	35-9B	1 g	36-9	5 g	36-9B				
80 µm	1 g	35-10	5 g	35-10B	1 g	36-10	5 g	36-10B				
100 µm	1 g	35-11	5 g	35-11B	1 g	36-11	5 g	36-11B				
120 µm	1 g	35-12	5 g	35-12B								
140 µm	1 g	35-13	5 g	35-13B								

fluorescent green: 468/508 nm  
 fluorescent red: 542/612 nm  
 fluorescent blue: 365/447 nm,  
 412/447 nm,  
 412/473 nm  
 The exact excitation and emission maxima may vary depending on the size and composition of the particles.

- All particle size standards are traceable to NIST (*National Inst. of Standards and Technology*). The CVs (relative standard deviations) are 3 - 20%.
- The products will be supplied as stabilized aqueous suspensions in 15mL or 90mL dropper-tipped bottles or as dry powders in 1.0 gram or 5.0 gram quantities.

• Prices:

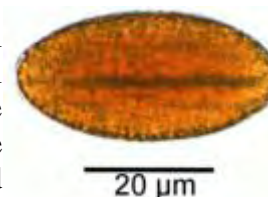
10 mL	15 mL	60 mL/90 mL	1,0 g	5,0 g
250 Euro		1125 Euro	375 Euro	1380 Euro

## Shape Reference Particles

(Dr.Lerche)

Shape Reference Particles are microParticles with uniform but **non-spherical** shape in opposite to the typical size calibration standards. They are designated to be applied for calibrating and testing of particle analysing instruments especially for determination of shape specific particle size and morphology. Typical application is the quality control of image analyzing particle sizers and validation of shape-sensitive particle sizing methods and procedures.

The currently available sporopollenin microParticles do have prolate spherical shapes (*like American Footballs*) which can be described by geometrical macroshape descriptors according to ISO 9276-6:2008. These data are documented in the accompanying certificate of analysis: area equivalent particle diameter, volume, area, perimeter, the minimal and maximal Feret diameters  $xF_{min}$  und  $xF_{max}$ , aspect ratio, compactness, extent and form factor.



The sporopollenin microParticles exhibit a native fluorescence (green: FITC-filter set, red: TRITC-filter set) and can be detected with fluorescence capable instruments. The fluorescence signals can provide adequate shape information, because fluorescence is emitted from the outer shell of the particles. For application in fluorescence instruments e.g. confocal laser scanning microscopes or fluorescence particle sensors no additional labelling is required.



Shape Reference Particles will be supplied as 100mg of powder or as 3.0mL of an aqueous/ethanolic suspension with a certificate. These products are exclusively determined for laboratory use only and not for diagnostic or therapeutical applications.

If an appropriate storage takes place Shape Reference Particles have a shelf life of twelf months calculated from date of delivery.

Feret Diameter		Standard Deviation		Quantity	Catalog Number	Price [Euro]
$xF_{min}$	$xF_{max}$	$xF_{min}$	$xF_{max}$			
<b>24.3µm</b>	<b>42.9µm</b>	±3.3µm	±3.3µm	3.0mL Suspension	251-0121	204.00
<b>19.7µm</b>	<b>37.2µm</b>	±3.2µm	±5.0µm	100mg Powder	251-0113	240.00



## Polystyrene Particles with Paramagnetic Core

(microParticles)

Monodisperse, spherical particles in aqueous suspension

Particle Diameter [ $\mu\text{m}$ ]	Standard Deviation [ % ]	Iron Oxid Content [ weight % ]	Solids Content [ weight % ]	Catalogue Number	Price [ EURO ]	
					5 mL	15 mL
0.270 <sup>1)</sup>	5.3%	>40	2.5	PS-MAG-S1850	127 €	292 €
0.360 <sup>1)</sup>	3.0%	>40	2.5	PS-MAG-S1983	127 €	292 €
0.536 <sup>1)</sup>	4.5%	>30	2.5	PS-MAG-S1984-1	127 €	292 €
1.33 <sup>2)</sup>	5.2%	>30	5.0	PS-MAG-S1645	155 €	355 €
3.90 <sup>2)</sup>	3.3%	>30	5.0	PS-MAG-S2180	155 €	355 €
5.61 <sup>3)</sup>	3.7%	>20	5.0	PS-MAG-S1684	155 €	355 €
10.43 <sup>3)</sup>	2.0%	>20	5.0	PS-MAG-S2874	205 €	467 €
18.82 <sup>3)</sup>	2.1%	>15	5.0	PS-MAG-S1985	205 €	467 €
41.13 <sup>3)</sup>	1.8%	>25	5.0	PS-MAG-S1986	205 €	467 €
67.4 <sup>3)</sup>	1.4%	>10	5.0	PS-MAG-S2303	205 €	467 €
89.0 <sup>3)</sup>	0.9%	10	5.0	PS-MAG-AR110	205 €	467 €
135 <sup>3)</sup>	0.9%	>7.5	5.0	PS-MAG-S2305	205 €	467 €
256 <sup>3)</sup>	1.3%	30	5.0	PS-MAG-AR111	205 €	467 €
375 <sup>3)</sup>	1.9%	>5	5.0	PS-MAG-S2307	205 €	467 €

<sup>1)</sup> Determined by Scanning Electron Microscopy

<sup>2)</sup> Determined by COULTER™ Multisizer

<sup>3)</sup> Determined by Optical Microscopy

## Silica Particles with Paramagnetic Core

(microParticles)

Monodisperse, spherical particles in aqueous suspension

Particle Diameter [ $\mu\text{m}$ ]	Standard Deviation [ $\mu\text{m}$ ]	CV [ % ]	Iron Oxid Content [ weight % ]	Solids Content [ weight % ]	Price [ EURO ]	
					5 mL	15 mL
0.51 <sup>4)</sup>	0.03	5.5%	>30	2.5	127 €	292 €
0.96 <sup>1)</sup>	0.05	5.2%	>25	5.0	127 €	292 €
1.51 <sup>2)</sup>	0.05	3.3%	>25	5.0	155 €	355 €
2.47 <sup>3)</sup>	0.07	2.9%	>25	5.0	155 €	355 €
7.52 <sup>3)</sup>	0.26	3.5%	>15	5.0	155 €	355 €

<sup>1)</sup> Determined by Scanning Electron Microscopy (SEM)

<sup>2)</sup> Determined by COULTER™ Multisizer

<sup>3)</sup> Determined by Optical Microscopy