



# Eppendorf Purity Grades for Consumables

Which are the right purity grades for my applications?

Eppendorf consumables stand for the highest quality and purity. This is achieved by the following:

- › Manufacturing using the purest raw materials
- › Fully automatic production in clean room conditions
- › Quality and functional checks of all lots
- › Continuous quality assurance throughout the entire production process – from the initial material to the finished product

With the strictest control criteria, internally and externally monitored, we guarantee the consistently high quality of our products – lot by lot.

# About the Purity Grades

## Eppendorf purity grades for tips, tubes, and plates



### Eppendorf Quality™

The “Eppendorf Quality” fulfill everything expected of reliable, easy-to-handle consumables. With the aid of high-quality base material and permanent checks during production, Eppendorf consumables in “Eppendorf Quality” are ideal for many tasks in the lab.



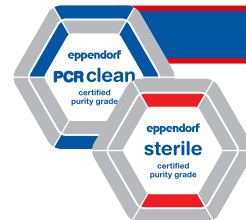
### Sterile

Eppendorf consumables with the purity grade “Sterile” are sterilized by irradiation according to ISO 11137 or by the ethylene oxide according to ISO 11135 with a Sterility Assurance Level (SAL) of 10<sup>-6</sup>. Lot-specific certificates document sterility and the absence of endotoxins in accordance with Ph. Eur. 2.6.14.



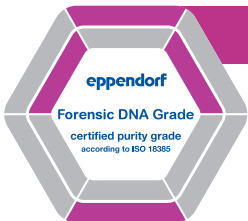
### PCR Clean

All Eppendorf consumables with the purity grade “PCR clean” are DNase and RNase-free, and free PCR inhibitors. It is also guaranteed that the consumables are free of contaminating human DNA.



### PCR Clean + Sterile

The purity level “PCR clean + Sterile” certifies the criteria of the purity level “PCR clean” and “Sterile”. For further details please read the respective purity grades.



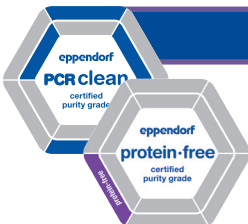
### DNA Grade

The demanding requirements of the ISO 18385 are fulfilled by “Eppendorf Forensic DNA Grade” consumables. These products help to further minimize the risk of human DNA contamination in forensic DNA analysis. Individually blistered packaging or “mini batches” in resealable bags also help to protect against contamination.



### Eppendorf Biopur®

Consumables available in this highest possible degree of Eppendorf purity grades are guaranteed to be sterile and free of pyrogens, RNases, DNases, DNA and ATP as well as PCR inhibitors. Individually blistered packaging provides effective protection against soiling and contamination.



### PCR Clean + Protein-free

The purity level “PCR clean + Protein-free” certifies the criteria of the purity level “PCR clean” and is in addition protein-free and thus free of unspecific signals or reactions due to protein contamination.

# Eppendorf Purity Grades Selection Guide

						
	Eppendorf Quality™	Sterile	PCR clean	PCR clean and sterile*	Forensic DNA Grade*	Biopur®*

## Continuous quality control for the following relevant criteria

Function, tightness, precision	■	■	■	■	■	■
Low wetting	■	■	■	■	■	■
High chemical resistance	■	■	■	■	■	■
High thermal resistance	■	■	■	■	■	■
High centrifugation stability**	■	■	■	■	■	■
High transparency	■	■	■	■	■	■
Precisely shaped	■	■	■	■	■	■

## Lot-specific certified for the following purity criteria

Human DNA-free			■	■	■	■
DNA-free (human + bacterial DNA)						■
DNase-free			■	■	■	■
RNase-free			■	■	■	■
PCR inhibitor-free			■	■	■	■
ATP-free						■
Pyrogen-free (endotoxin-free)		■		■		■
Sterile (Ph.Eur./USP)		■		■		■

## Methods (Examples)

Applications requiring high general quality, but no checked special purities	■					
Bacteria and yeast cultures		■		■		■
Cell and tissue culture		■		■		■ ■
Isolation and storage of DNA			■ ■	■	■ ■	■
Isolation and storage of RNA			■	■	■	■ ■
DNA analysis (PCR, restriction analysis, hybridization, sequencing , NGS)			■ ■	■	■ ■	■
Mitochondrial DNA analysis					■ ■	■ ■
Bacterial DNA analysis						■ ■
RNA analysis					■	■ ■

## Application Areas (Examples)

Routine application	■					
Molecular biology			■ ■	■	■ ■	■
Microbiology		■		■		■
Cell technology		■		■		■ ■
> Stem cell research						
> Transgenic animals / plants						
Research		■	■	■		■ ■
> Medical research						
> Agriculture & aquaculture research						
Quality control		■	■	■		■ ■
> Food and beverage						
> Water supply						
> Environmental monitoring						
Forensic			■	■	■ ■	■

■ Recommended   ■ ■ Highly recommended

\* Increased safety due to availability of individually packaged / single-blistered products.

\*\* For accurate details regarding resistance to centrifugation, please refer to the product individual instruction for use.

# Importance of Purity Criteria

## Sterility

Per definition, a sterile product does not harbor any living organisms on its surface. The degree of sterilization is described by a residual probability of contamination. This probability is expressed as SAL (Sterility Assurance Level). Thus, an SAL value of  $10^{-6}$  indicates the probability of occurrence of one non-sterile item among  $10^6$  (1,000,000) sterilized items.

## Pyrogen-free (endotoxin-free)

Thermostable substances (glycoproteins) from the outer membrane of bacteria and other microorganisms can cause fever in humans and impair the growth of cell cultures.

## Bacterial DNA-free (E. coli)

DNA is found in all cells of living entities, and it is the carrier of genetic information. The highly sensitive PCR technique enables the amplification of smallest amounts of DNA.

## Human DNA-free

Contamination belongs to the major concerns in DNA analysis, especially when working with human DNA. The Eppendorf manufacturing plant is highly automated and monitored by staff wearing protective clothing. Furthermore, access to the production area is severely restricted, and positive air pressure prevents the intrusion of particles. The final tests for the presence of human DNA are performed by an external laboratory accredited to ISO 17025.

## DNase-free

DNases are enzymes which degrade DNA.

## RNase-free

RNases are enzymes that degrade RNA. These enzymes are extremely resistant, even to autoclaving and irradiation.

## ATP-free

ATP is a part of all living cells; therefore, its presence can indicate biological contamination.

## PCR inhibitor-free

PCR – the replication of DNA – has established itself as one of the most important and commonplace molecular biology methods used in almost all fields of life sciences where DNA is analyzed. However, there are also substances that impair this reaction, so lab products must be free of these inhibitors.

## Importance

Sterile products are required whenever the presence of germs may have a negative effect; for example, to prevent infection of samples or incorrect test results for microbiological experiments that would be caused by unsterile lab equipment.

## Importance

Absence of pyrogen prevents endotoxin-based contamination in cell culture, pharmaceutical, and medical research laboratories.

## Importance

The presence of a DNA contamination could lead to false positive results for different applications involving DNA. Note: Autoclaving is not suitable for removing traces of DNA.

## Importance

Contamination may lead to cross contamination of the sample or even false positive results. Even the fragment length of contaminating DNA could be important – e.g. in forensics, the relevant fragment length for DNA genotyping starts at approx. 70 bp. Therefore, the »Eppendorf Forensic DNA Grade«-consumables are tested with a highly sensitive qPCR targeting a multi copy human DNA fragment of 62 bp. This is one important aspect qualifying this purity grade for forensic DNA analysis.

## Importance

DNase contaminations can affect or even ruin DNA analysis.

## Importance

RNase-free products are an absolute must in the field of molecular biology because RNA is highly sensitive and can be destroyed very quickly by RNases.

## Importance

The test procedure for the quantitative and qualitative detection of ATP is already an integral part of hygiene monitoring, e.g. in the pharmaceutical industry.

## Importance

It is essential that the consumables used contain no impurities that could adversely affect PCR. This is particularly crucial if only low amounts of template DNA are available.

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