

## Water for Injection (WFI)

Water for Injection (WFI) by definition is water that is intended for use in the manufacture of medicines for parenteral administration whose solvent is water (WFI in bulk), or water that is used to dissolve or dilute substances or preparations for parenteral administration (heat-sterilized WFI). WFI in bulk from Biochrom AG is sterile-filtered and intended for *in vitro* use. WFI in bulk is suitable for use in the manufacture of media for biopharmaceutical production or for the manufacture of buffers. All solutions produced by Biochrom AG for cell culture and buffers are based on WFI in bulk water quality.

WFI in bulk is offered in single-use bags from 100 l. Biochrom AG also offers ultra-pure water in smaller fillings suitable for HPLC. It is produced from WFI in bulk and filled in PET bottles.

The validated primary packaging (sterile plastic bags for 100, 200, 500, or 1000 l for single-use) guarantees the required specifications for WFI with regard to the critical parameters of total organic carbon (TOC) and conductivity for at least 3 months.

Product	Cat. No.	Unit
<b>Ultra pure water, sterile, suitable for HPLC</b> Storage temperature: RT (room temperature)	L 0015	500 ml
	L 0020	1 l
<b>Ultra pure water, not sterile</b> Storage temperature: RT	L 0030	5 l
	L 0040	1x10 l
		5x10 l
		10x10 l
<b>WFI in bulk, sterile-filtered</b> Storage temperature: RT  Please note: Larger volumes of 100 – 1000 l are shipped in transport validated stainless-steel containers, smaller bag volumes in plastic boxes. The stainless steel boxes (“container”) by Biochrom AG are not suitable for transport by airfreight or seafreight. Consequently, container deliveries are not possible outside Europe.	L 9042-100	100 l
	L 9042-200	200 l
	L 9042-500	500 l
	L 9042-1000	1000 l

### WFI from Biochrom AG

Biopharmaceutical production methods often require large quantities of „pharmaceutical-grade“ ultra pure water. However, this water is only approved as Water for Injection (WFI) for the manufacture (direct or indirect) of medicines if it is of reproducible quality and satisfies the relevant specifications. Depending on local water quality, several processing steps are required in order to manufacture pharmaceutical quality water from the raw material „drinking water“. The microbiological, chemical, and physical parameters to be observed are specified in the European Pharmacopoeia (Ph. Eur.) and elsewhere. Validation of WFI manufacture, storage, and shipping is a legal requirement.

The sterile-filtered WFI in bulk from Biochrom AG is sterile-filtered and bottled aseptically in a class A cleanroom environment. It has very low conductivity and a very low concentration of organic components (TOC). In order to ensure that the water is of sufficient quality, in addition to the in-process monitoring of the electrical conductivity, the microbiological parameters are also regularly monitored, and the following parameters are amongst those that are determined: number of colony-forming units (CFU) of aerobic bacteria or the level of bacteria endotoxins. These WFI in bulk parameters are within the appropriate limits (see table 40).

All parameters for both specifications are listed in the table on the next page for comparison purposes.

Tab. 40: Comparison of typical parameters for WFI in bulk from Biochrom AG and sterilized WFI (all data in the Ph. Eur.)

Parameters	WFI in bulk from Biochrom AG	Sterilized WFI
Manufacture from drinking water or from purified water	x	x
Manufacturing process: Distillation	x	x
Product-contacting parts (quartz glass, neutral glass or suitable metal)	x	x
Appearance	colourless, clear	colourless, clear
(CFU) bacterial count, aerobic bacteria <sup>1</sup>	sterile (sterile-filtered)	sterile (heat sterilization in closed container)
Total organic carbon (TOC, ppb)	≤ 500	no data
Conductivity, at +20 °C (µS/cm)	≤ 1.1 at +20 °C*	≤ +25 at +25 °C in containers of maximum 10 ml nominal volume (NV) ≤ +5 at +25 °C in containers with more than 10 ml NV
Nitrate (ppm)	≤ 0.2	≤ 0.2
Endotoxins (EU/ml)	< 0.25	< 0.25
Acid and alkaline solutions	**	x
Oxidisable substances	**	no data
Chloride	**	≤ 0.5 ppm in containers of maximum 100 ml NV
Sulphate	**	x
Ammonium ppm	**	≤ 0.2
Calcium, Magnesium	**	x
Residue on evaporation (percent)	**	0.004 (max 10 ml), 0.003 at more than 10 ml NV

\* at the time of bottling

\*\* no specification acc. to Ph. Eur.

<sup>1</sup> under normal conditions the number of CFU aerobic bacteria should not exceed 10 microorganisms per 100 ml, determined by means of membrane filtration, using agar medium S and at least 200 ml WFI in bulk after 5 days' incubation at +30 – +35 °C