

Comparison of BD CBA Flex Set Standards to the NIBSC/WHO International Standards

The NIBSC protein standards are recognized by the World Health Organization (WHO) as international biological standards. They meet established requirements for accuracy, consistency, and stability. The NIBSC/WHO standards are assigned potency values in International Units (IU) of biological activity and nominal mass (ie, not absolute mass values). Therefore they cannot be used to establish absolute concentrations for a cytokine preparation.

However, these standards do provide a means to facilitate comparisons of cytokine concentration values determined by experiments conducted within different laboratories or methods. The source of a recombinant protein (ie, insect cell, E. coli, etc.) and the affinity of antibodies used can affect the measurement and performance of a protein in an immunoassay. The conversion factors provided in the the following table make it possible to compare protein concentrations in samples measured by different immunoassays that have been standardized to the same NIBSC/WHO standards.

The conversion factor may change based on the batch of either standard. Therefore, the conversion factor is intended to be a guideline indicating whether a BD CBA assay over- or underestimates analyte concentrations relative to the NIBSC/WHO standards. Researchers are advised to incorporate both sets of standards in their assays if they wish to derive data from the NIBSC/WHO standards.

NIBSC conversion factor summary for BD CBA Flex Set Standards

	NIBSC STANDARD			CALCULATED CONCENTRATION USING BD CBA FLEX SET (pg/mL)	NOMINAL NIBSC CONCENTRATION (pg/mL)	BD CBA FLEX SET: NIBSC/WHO MASS CONVERSION FACTOR
	CODE NO.	MASS UNITS / VIAL	IU VALUE			
Human b-FGF	90-712	4 µg	1,600	1,295.87 ± 103.20	2,500	1.97
Human G-CSF	88-502	100 ng	10,000	1,231.33 ± 87.71	2,500	2.06
Human GM-CSF	88-646	1 µg	10,000	1,551.45 ± 70.33	2,500	1.62
Human IFN-γ	87-586	12.5 ng	250	1,287.44 ± 174.12	2,500	1.97
Human IL-1β	86-680	1 µg	100,000	2,610.76 ± 129.84	2,500	0.97
Human IL-2	86-504	7.6 ng	100	2,148.20 ± 193.43	2,500	1.17
Human IL-3	91-510	1 µg	1,700	1,822.31 ± 117.76	2,500	1.39
Human IL-4	88-656	100 ng	1,000	1,535.99 ± 79.24	2,500	1.65
Human IL-5	90-586	500 ng	5,000	1,084.09 ± 254.01	2,500	2.38
Human IL-6	89-548	1 µg	100,000	2,041.22 ± 220.02	2,500	1.25
Human IL-7	90-530	1 µg	100,000	573.00 ± 94.55	2,500	4.44
Human IL-8	89-520	1 µg	1,000	2,448.42 ± 153.34	2,500	1.04
Human IL-9	91-678	100 ng	1,000	601.58 ± 35.24	2,500	4.20
Human IL-10	93-722	1 µg	5,000	2,510.49 ± 144.61	2,500	1.01
Human IL-11	92-788	500 ng	5,000	13,401.31 ± 1390.37	10,000	0.75
Human IL-12p70	95-544	1 µg	10,000	1,307.09 ± 71.6	2,500	1.93
Human IL-13	95-622	1 µg	1,000	2,723.24 ± 660.88	2,500	0.93
Human MCP-1	92-794	5 µg	5,000 arbitrary units	2,280.63 ± 150.6	2,500	1.10
Human MIP-1α	92-518	2 µg	200 arbitrary units	1,242.93 ± 40.98	2,500	2.04
Human OSM	93-564	1 µg	25,000	531.11 ± 34.17	2,500	4.75
Human RANTES	92-520	10 µg	100,000 arbitrary units	1,589.05 ± 181.79	2,500	1.60
Human TNF	88-786	1 µg	46,500	1,642.65 ± 99.14	2,500	1.54
Human TNFRI	96-528	10 µg	not provided	12,214.45 ± 1165.96	10,000	0.83
Human TNFRII	93-524	10 µg	not provided	707.95 ± 46.45	2,500	3.57
Human VEGF	02-286	13 µg	13,000	1,250.615 ± 72.77	2,500	2.03
Mouse GM-CSF	91-658	1 µg	100,000 arbitrary units	1,748.55 ± 132.95	2,500	1.46
Mouse IL-1β	93-668	100 ng	100,000 arbitrary units	4,531.11 ± 393.89	2,500	0.56
Mouse IL-2	93-566	100 ng	10,000 arbitrary units	368.74 ± 41.31	2,500	6.92
Mouse IL-3	91-662	1 µg	100,000 arbitrary units	1,309.44 ± 77.95	2,500	1.93
Mouse IL-4	91-656	1 µg	10,000 arbitrary units	439.64 ± 43.03	2,500	5.76
Mouse IL-6	93-730	100 ng	10,000 arbitrary units	221.70 ± 49.24	2,500	11.40
Mouse TNF	88-532	1 µg	200,000 arbitrary units	1,540.95 ± 191.70	2,500	1.67