

# Protein quantitation assay compatibility table

No single protein assay is compatible with all sample components that might be encountered in a typical laboratory. To avoid the frustration of discovering incompatibility by trial and error, review the compatibility table on the following pages (Table 1) that summarizes compatible substances for several popular protein assays. The table serves as a guide for assessing which protein assay might be most effective with a given sample type. Use this information as a guide only. Since it is possible for sample and assay components to have an additive effect, we recommend verifying the compatibility of your specific sample buffer components.

## About the compatibility table

The table lists the maximum compatible concentrations for substances tested based on the midpoint concentration of a BSA standard. This is 1,000 µg/mL for most assays and 10 µg/mL for Thermo Scientific™ Pierce™ microplate BCA protein assay kits. A substance was considered compatible at the indicated concentration if the error in protein concentration estimation caused by the presence of the substance in a sample was less than or equal to 10%. The protein assays were conducted using the test tube procedure unless formulated for smaller volumes (e.g., Pierce microplate BCA protein assays). The Pierce microplate BCA protein assay kits and the Invitrogen™ Qubit™ Protein BR Assay Kit were used with a microplate and PCR tube, respectively.

## Notes and symbols

The concentration listed refers to the actual concentration in the protein sample. An Ø denotes compounds that were not compatible at the lowest concentrations tested. NA indicates the substance has not been tested for that assay. Compounds are listed alphabetically under common names or abbreviations with the exception of sodium compounds, which are alphabetized under “Na”. Dilutions are expressed as undiluted or as a ratio, where 1:2 indicates 2-fold dilution.

**Table 1. Substances compatible with Thermo Scientific™ Pierce™ protein assays and the Qubit Protein BR Assay.**

Test compound	Pierce Rapid Gold BCA	Pierce BCA	Pierce Microplate BCA-RAC*	Pierce Micro BCA	Pierce Modified Lowry	Pierce Detergent Compatible Bradford	Pierce Coomassie Plus	Pierce Coomassie	Pierce 660 nm	Qubit Protein BR Assay
2D sample buffer <sup>†</sup>	NA	NA	NA	NA	NA	NA	NA	NA	Undiluted**	NA
2-mercaptoethanol	∅	0.01%	25 mM (35)	1 mM	1 mM	1 M	1 M	1 M	1 M	1 mM
ACES, pH 7.8	25 mM	25 mM	∅	10 mM	NA	NA	100 mM	100 mM	50 mM	NA
Acetone	10%	10%	∅	1%	10%	10%	10%	10%	50%	NA
Acetonitrile	10%	10%	30%	1%	10%	10%	10%	10%	50%	20%
Ammonium sulfate	∅	∅	∅	∅	∅	1 M	1 M	1 M	125 mM	200 mM
Aprotinin	10 mg/L	10 mg/L	∅	1 mg/L	10 mg/L	10 mg/mL	10 mg/L	10 mg/L	2 mM	NA
Ascorbic acid	NA	∅	NA	∅	1 mM	50 mM	50 mM	50 mM	500 mM	NA
Asparagine	NA	1 mM	∅	NA	5 mM	NA	10 mM	10 mM	40 mM	NA
Bicine	20 mM	20 mM	1 mM	2 mM	NA	100 mM	100 mM	100 mM	>1 M	100 mM
Bis-Tris, pH 6.5	NA	33 mM	16.5 mM	0.2 mM	NA	100 mM	100 mM	100 mM	50 mM	NA
Borate (50 mM), pH 8.5	Undiluted	Undiluted	∅	1:4	NA	Undiluted	Undiluted	Undiluted	Undiluted	Undiluted
B-PER reagent	Undiluted	Undiluted	1:3	NA	NA	Undiluted	1:2	1:2	1:2	Undiluted
B-PER reagent II	NA	NA	1:4	NA	NA	NA	1:4	NA	1:2	Undiluted
B-PER reagent PBS	NA	NA	1:4	NA	NA	Undiluted	NA	NA	1:2	Undiluted
Brij-35	5%	5%	0.63%	5%	0.031%	1%	0.062%	0.125%	5%	NA
Brij-56	NA	1%	NA	1%	0.062%	NA	0.031%	0.031%	NA	NA
Brij-58	1%	1%	0.50%	1%	0.062%	1%	0.016%	0.031%	5%	NA
Bromophenol blue (in 50 mM NaOH)	∅	∅	∅	∅	∅	NA	∅	∅	0.031%	NA
Calcium chloride (in TBS, pH 7.2)	10 mM	10 mM	1 mM	10 mM	NA	10 mM	10 mM	10 mM	40 mM	NA
Cesium bicarbonate	NA	100 mM	∅	100 mM	50 mM	NA	100 mM	100 mM	100 mM	NA
Cetylpyridinium chloride	NA	NA	NA	NA	NA	NA	NA	NA	2.5%**	NA
CHAPS	5%	5%	10% (10)	1%	0.062%	5%	5%	5%	5%	5%
CHAPSO	5%	5%	∅	5%	0.031%	5%	5%	5%	4%	NA
CHES	100 mM	100 mM	50 mM	100 mM	NA	NA	100 mM	100 mM	>500 mM	NA
Cobalt chloride (in TBS, pH 7.2)	0.8 mM	0.8 mM	0.4 mM	∅	NA	NA	10 mM	10 mM	20 mM	NA
CTAB	NA	NA	NA	NA	NA	NA	NA	NA	2.5%**	NA
Cysteine	NA	∅	2.5 mM	∅	1 mM	10 mM	10 mM	10 mM	350 mM	NA
Dithioerythritol (DTE)	NA	1 mM	2.5 mM	∅	∅	NA	1 mM	1 mM	25 mM	NA
Dithiothreitol (DTT)	∅	1 mM	5 mM (5)	∅	∅	5 mM	5 mM	5 mM	500 mM	5 mM
DMF	10%	10%	5%	1%	10%	10%	10%	10%	50%	NA
DMSO	10%	10%	0.25%	1%	10%	10%	10%	10%	50%	NA
DTAB	NA	NA	NA	NA	NA	NA	NA	NA	2%**	50 mM
EDTA	10 mM	10 mM	5 mM (20)	0.5 mM	1 mM	100 mM	100 mM	100 mM	20 mM	NA
EGTA	NA	∅	5 mM (10)	∅	1 mM	2 mM	2 mM	2 mM	20 mM	NA
EPPS, pH 8.0	100 mM	100 mM	∅	100 mM	NA	NA	100 mM	100 mM	200 mM	NA
Ethanol	10%	10%	∅	1%	10%	10%	10%	10%	50%	NA
Ferric chloride (in TBS, pH 7.2)	10 mM	10 mM	5 mM	0.5 mM	NA	NA	10 mM	10 mM	5 mM	NA
Glucose	10 mM	10 mM	∅	1 mM	100 mM	NA	1 mM	1 mM	500 mM	1 M
Glutathione (reduced)	NA	NA	10 mM	NA	NA	NA	NA	NA	100 mM	NA
Glycerol (fresh)	10%	10%	5%	1%	10%	10%	10%	10%	50%	10%
Glycine-HCl, pH 2.8	100 mM	100 mM	50 mM	NA	100 mM	100 mM	100 mM	100 mM	100 mM	∅
Guanidine-HCl	4 M	4 M	1.5 M (2)	4 M	NA	1.25 M	3.5 M	3.5 M	2.5 M	4 M
HEPES, pH 7.5	100 mM	100 mM	200 mM (200)	100 mM	1 mM	100 mM	100 mM	100 mM	100 mM	NA
Hydrides (Na <sub>2</sub> BH <sub>4</sub> or NaCNBH <sub>3</sub> )	NA	∅	NA	∅	NA	NA	NA	NA	∅	NA

Test compound	Pierce Rapid Gold BCA	Pierce BCA	Pierce Microplate BCA-RAC*	Pierce Micro BCA	Pierce Modified Lowry	Pierce Detergent Compatible Bradford	Pierce Coomassie Plus	Pierce Coomassie	Pierce 660 nm	Qubit Protein BR Assay
Hydrochloric acid (HCl)	100 mM	100 mM	Ø	10 mM	100 mM	100 mM	100 mM	100 mM	125 mM	NA
Imidazole, pH 7.0	12.5 mM	50 mM	30 mM (50)	12.5 mM	25 mM	200 mM	200 mM	200 mM	200 mM	200 mM
I-PER reagent	Undiluted	Undiluted	NA	NA	NA	NA	NA	NA	1:4	Undiluted
Laemmli SDS sample buffer†	Ø	Ø	Ø	Ø	Ø	NA	Ø	Ø		NA
Leupeptin	10 mg/L	10 mg/L	Ø	10 mg/L	10 mg/L	10 mg/L	10 mg/L	10 mg/L	80 µM	NA
Mannitol	NA	NA	NA	NA	NA	NA	NA	NA	100 mM	NA
Melibiose	NA	Ø	NA	NA	25 mM	NA	100 mM	100 mM	500 mM	NA
Mem-PER reagent	Undiluted	Undiluted	1:2	Undiluted	NA	NA	Undiluted	NA	Undiluted	Undiluted
Mem-PER Plus reagent	Undiluted	Undiluted	NA	Undiluted	NA	Undiluted	NA	NA	Undiluted	NA
MES-buffered saline, pH 4.7†	Undiluted	Undiluted	Ø	1:4	NA	Undiluted	Undiluted	Undiluted	Undiluted	NA
MES, pH 6.1	100 mM	100 mM	100 mM (100)	100 mM	125 mM	100 mM	100 mM	100 mM	125 mM	125 mM
Methanol	NA	10%	0.5%	1%	10 %	10%	10%	10%	50%	NA
Magnesium chloride	NA	NA	100 mM	NA	NA	500 mM	NA	NA	>1 M	NA
Modified Dulbecco's PBS†	NA	Undiluted	Undiluted	Undiluted	NA	Undiluted	Undiluted	Undiluted	Undiluted	Undiluted
MOPS, pH 7.2	100 mM	100 mM	200 mM	100 mM	NA	100 mM	100 mM	100 mM	125 mM	100 mM
M-PER reagent	Undiluted	Undiluted	1:2	NA	NA	Undiluted	Undiluted	NA	1:2	Undiluted
N-acetylglucosamine	10 mM	10 mM	Ø	Ø	NA	NA	100 mM	100 mM	100 mM	NA
Na (sodium) acetate, pH 4.8	200 mM	200 mM	Ø	200 mM	200 mM	180 mM	180 mM	180 mM	100 mM	NA
Na azide	0.2%	0.2%	0.01%	0.20%	0.2%	0.5%	0.5%	0.5%	0.125%	NA
Na bicarbonate	100 mM	100 mM	Ø	100 mM	100 mM	100 mM	100 mM	100 mM	100 mM	NA
Na carbonate-bicarbonate, pH 9.4†	NA	Undiluted	Undiluted	Undiluted	NA	Undiluted	Undiluted	Undiluted	1:3	0.2 M
Na chloride	NA	1 M	150 mM	1 M	1 M	1 M	5 M	5 M	1.25 M	5 M
Na citrate, pH 4.8	200 mM	200 mM	50 mM	5 mM	NA	200 mM	200 mM	200 mM	12.5 mM	NA
Na citrate-carbonate, pH 9.0†	1:8	1:8	Ø	1:600	NA	NA	Undiluted	Undiluted	Ø	NA
Na citrate-MOPS, pH 7.5†	1:8	1:8	Undiluted	1:600	NA	NA	NA	Undiluted	1:16	NA
Na deoxycholate	5%	5%	NA	5%	NA	0.1%	0.4%	0.05%	0.25%	NA
Na hydroxide (NaOH)	100 mM	100 mM	Ø	50 mM	100 mM	75 mM	100 mM	100 mM	125 mM	NA
Na phosphate	100 mM	100 mM	100 mM	100 mM	100 mM	100 mM	100 mM	100 mM	500 mM	NA
NE-PER reagent (CER)	1:2	Undiluted	1:2	NA	NA	Undiluted	1:4	NA	Undiluted	Undiluted
NE-PER reagent (NER)	Undiluted	Undiluted	1:4	NA	NA	NA	Undiluted	NA	Undiluted	Undiluted
Nickel chloride (in TBS, pH 7.2)	NA	10 mM	Ø	0.2 mM	NA	NA	10 mM	10 mM	10 mM	NA
NP-40	5%	5%	Ø	5%	0.016%	1%	0.5%	0.5%	5%	5%
Octyl beta-glucoside	5%	5%	2.5% (10)	0.1%	0.031%	5%	0.5%	0.5%	5%	NA
Octylthioglucoside	NA	5%	7%	5%	NA	5%	3%	3%	10%	NA
Na-orthovanadate (in PBS, pH 7.2)	1 mM	1 mM	0.5 mM	1 mM	NA	NA	1 mM	1 mM	50 mM	NA
Phenol red	NA	Ø	3.125 µg/mL	Ø	NA	0.5 mg/mL	0.5 mg/mL	0.5 mg/mL	0.5 mg/mL	NA
Phosphate-buffered saline (PBS)†	Undiluted	Undiluted	Undiluted	Undiluted	NA	Undiluted	Undiluted	Undiluted	Undiluted	Undiluted
PIPES pH 6.8	NA	100 mM	25 mM	100 mM	NA	NA	100 mM	100 mM	100 mM	NA
PMSF in isopropanol	1 mM	1 mM	0.125 mM	1 mM	1 mM	1 mM	1 mM	1 mM	1 mM	1 mM
Potassium thiocyanate	3 M	3 M	Ø	NA	100 mM	NA	3 M	3 M	250 mM	NA
P-PER reagent	NA	Ø	1:2	NA	Ø	NA	Ø	Ø	1:2	NA
RIPA buffer†	Undiluted	Undiluted	1:2	1:10	NA	1:4	1:40	1:10	Undiluted	Undiluted
SDS	5%	5%	5% (10)	5%	1%	0.5%	0.016%	0.125%	0.01%, 5%**	5%

Test compound	Pierce Rapid Gold BCA	Pierce BCA	Pierce Microplate BCA-RAC*	Pierce Micro BCA	Pierce Modified Lowry	Pierce Detergent Compatible Bradford	Pierce Coomassie Plus	Pierce Coomassie	Pierce 660 nm	Qubit Protein BR Assay
Span 20	0.5%	1%	NA	1%	0.25%	NA	0.5%	0.5%	NA	NA
Sucrose	40%	40%	40% (40)	4%	7.5%	10%	10%	10%	50%	20%
TCEP	NA	NA	10 mM (10)	NA	NA	100 mM	NA	NA	40 mM	NA
Thimerosal	NA	0.01%	0.03%	Ø	0.01%	NA	0.01%	0.01%	0.25%	NA
Thiourea	NA	NA	NA	NA	NA	NA	NA	NA	2 M	NA
TLCK	0.1 mg/L	0.1 mg/L	Ø	0.1 mg/L	0.01 mg/L	NA	0.1 mg/mL	0.1 mg/L	5 mg/mL	NA
TPCK	0.1 mg/L	0.1 mg/L	Ø	0.1 mg/L	0.1 mg/L	NA	0.1 mg/mL	0.1 mg/L	4 mg/mL	NA
T-PER reagent	1:2	1:2	NA	NA	NA	Undiluted	Undiluted	NA	1:2	Undiluted
Tricine, pH 8.0	25 mM	25 mM	0.5 mM	2.5 mM	NA	NA	100 mM	100 mM	500 mM	50 mM
Triethanolamine, pH 7.8	25 mM	25 mM	25 mM	0.5 mM	NA	NA	100 mM	100 mM	100 mM	NA
Tris-buffered saline (TBS) <sup>†</sup>	Undiluted	Undiluted	Undiluted	1:10	NA	Undiluted	Undiluted	Undiluted	Undiluted	Undiluted
Tris-glycine, pH 8.0 <sup>†</sup>	1:2	1:3	Ø	1:10	NA	Undiluted	Undiluted	Undiluted	Undiluted	Ø
Tris-glycine-SDS, pH 8.3 <sup>†</sup>	Undiluted	Undiluted	Ø	Undiluted	NA	Undiluted	1:4	1:2	Undiluted**	Ø
Tris-HCl, pH 8.0	Ø	250 mM	35 mM (50)	50 mM	10 mM	2 M	2 M	2 M	250 mM	500 mM
Tris-HEPES-SDS <sup>†</sup>	100 mM	NA	NA	NA	NA	NA	NA	NA	Undiluted**	Undiluted
Triton X-100	5%	5%	7% (10)	5%	0.031%	1%	0.062%	0.125%	1%	5%
Triton X-114	1%	1%	2% (2)	0.05%	0.031%	1%	0.062%	0.125%	0.50%	NA
Triton X-305	1%	1%	1%	1%	0.031%	NA	0.125%	0.5%	9%	NA
Triton X-405	1%	1%	Ø	1%	0.031%	NA	0.025%	0.5%	5%	NA
Tween 20	5%	5%	10% (10)	5%	0.062%	1%	0.031%	0.062%	10%	3%
Tween 60	5%	5%	5%	0.5%	NA	NA	0.025%	0.1%	5%	NA
Tween 80	5%	5%	2.5%	5%	0.031%	0.1%	0.016%	0.062%	5%	NA
Urea	3 M	3 M	3 M (4)	3 M	3 M	3 M	3 M	3 M	8 M	3 M
Y-PER reagent	Ø	Undiluted	NA	NA	NA	NA	NA	NA	Ø	Ø
Y-PER Plus reagent	Ø	Undiluted	NA	NA	NA	Undiluted	Undiluted	NA	1:2	NA
Zinc chloride (in TBS, pH 7.2)	10 mM	10 mM	Ø	0.5 mM	NA	NA	10 mM	10 mM	10 mM	NA
Zwittergent 3-14	NA	1%	2% (2)	Ø	NA	NA	0.025%	0.025%	0.05%	NA

\* Selected values for the regular Pierce BCA Protein Assay Kit - Reducing Agent Compatible (RAC) are given in parentheses in the column for the Pierce Microplate BCA-RAC kit.

\*\* Value when the Pierce 660 nm assay is run using Thermo Scientific™ Ionic Detergent Compatibility Reagent for Pierce 600 nm Protein Assay (Cat. No. 22663).

<sup>†</sup> Compound (buffer) formulation is described more fully in the buffer formulations table (Table 2).

**Table 2. Buffer formulations used in compatibility testing.**

Buffer	Formulation	Cat. No.
2D sample buffer	8 M urea, 4% CHAPS or 7 M urea, 2 M thiourea, 4% CHAPS	–
Laemmli SDS sample buffer	65 mM Tris-HCl, 10% glycerol, 2% SDS, 0.025% bromophenol blue	LC2676
MES-buffered saline, pH 4.7	0.1 M MES, 150 mM NaCl (pH 4.7)	28390
Modified Dulbecco's PBS	8 mM sodium phosphate, 2 mM potassium phosphate, 0.14 M NaCl, 10 mM KCl (pH 7.4)	28374
Na carbonate-bicarbonate, pH 9.4	0.2 M sodium carbonate-bicarbonate (pH 9.4)	28382
Na citrate-carbonate, pH 9.0	0.6 M sodium citrate, 0.1 M sodium-carbonate (pH 9.0)	–
Na citrate-MOPS, pH 7.5	0.6 M sodium citrate, 0.1 M MOPS (pH 7.5)	–
Phosphate-buffered saline (PBS)	100 mM sodium phosphate, 150 mM NaCl (pH 7.2)	28372
RIPA buffer	50 mM Tris, 150 mM NaCl, 0.5% sodium deoxycholate, 1% NP-40, 0.1% SDS (pH 8.0)	89900
Tris-buffered saline (TBS)	25 mM Tris, 150 mM NaCl (pH 7.6)	28379
Tris-glycine, pH 8.0	25 mM Tris, 192 mM glycine (pH 8.0)	28380
Tris-glycine-SDS, pH 8.3	25 mM Tris, 192 mM glycine, 0.1% SDS (pH 8.3)	28378
Tris-HEPES-SDS	100 mM Tris, 100 mM HEPES, 3 mM SDS	28398

**Ordering information**

	Quantity	Cat. No.
Pierce Rapid Gold BCA Protein Assay Kit	250 mL	A53226
	500 mL	A53225
Pierce BCA Protein Assay Kit	500 mL	23227
	1 L	23225
Pierce Microplate BCA Protein Assay Kit - Reducing Agent Compatible	275 mL	23252
Pierce Micro BCA Protein Assay Kit	500 mL	23235
Pierce Modified Lowry Protein Assay Kit	530 mL	23240
Pierce Detergent Compatible Bradford Assay Kit	450 mL	23246
Pierce Coomassie Plus (Bradford) Assay Kit	950 mL	23236
Pierce Coomassie (Bradford) Protein Assay Kit	950 mL	23200
Pierce 660 nm Protein Assay Kit	450 mL	22662
Qubit Protein BR Assay Kit	100 assays	A50668
	500 assays	A50669

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