$MgCl_2$ (25mM)

#GP012.1250 (1.25 ml) | GP012.6250 (6.25 ml)
(FOR RESEARCH ONLY)

Product: Magnesium ion (Mg^{2+}) is an essential cofactor for DNA polymerase activity, as it enables the incorporation of dNTPs during DNA polymerization. Moreover, Mg^{2+} facilitates the binding of primers to DNA templates by stabilizing negative charges, thereby influencing annealing and melting temperatures.

High Mg^{2+} concentrations increase polymerase activity, however, at the cost of fidelity. dsDNA is stabilized by elevated Mg^{2+} concentrations thereby preventing denaturation and increasing the melting temperature. For the same reason, primer-dimer formation is increased with higher Mg^{2+} concentrations as well as annealing temperatures.

Bioavailability of Mg^{2+} in a PCR reaction is dependent on many parameters such as template DNA concentration and purity, primer concentration and purity, dNTP concentration, presence of chelators (e.g. EDTA) or the presence, type and concentration of fluorescent dyes. Thus, it is recommended to optimize the Mg^{2+} concentration for each new PCR reaction or whenever changing these parameters.

Applications: PCR

Quantity: #GP012.1250 contains 1.5 ml of 25mM $MgCl_2$ in PCR-grade water.
#GP012.6250 contains 5 vials of 1.5 ml of 25mM $MgCl_2$ in PCR-grade water.

Appearance: Clear transparent liquid

Storage: Store at 2-8ºC for up to 6 months or at -20ºC for up to 2 years.

Optimization:

The normal range of Mg^{2+} concentration used in PCR is 0.5mM to 5mM. Magnesium ions can be added either in the form of $MgCl_2$ or Mg_2SO_4. A normal starting concentration is 1.5mM $MgCl_2$. It is common practice that DNA polymerases are supplied with reaction buffers that already contain $MgCl_2$ in such a concentration that the final concentration will be 1.5mM. In the table hereunder the amount of 25mM $MgCl_2$ to be added to a reaction mixture without supplemented $MgCl_2$ as well to a reaction mixture already containing $MgCl_2$ (1.5mM final concentration) is given:

Final [$MgCl_2$] in a:	0.5mM	1.0mM	1.5mM	2.0mM	2.5mM	3.0mM	3.5mM	4.0mM	4.5mM	5.0mM
50µl reaction mixture w/o supplemented $MgCl_2$	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
25µl reaction mixture w/o supplemented $MgCl_2$	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
20µl reaction mixture w/o supplemented $MgCl_2$	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0
50µl reaction mixture with supplemented $MgCl_2$	x	x	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0
25µl reaction mixture with supplemented $MgCl_2$	x	x	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
20µl reaction mixture with supplemented $MgCl_2$	x	x	0.0	0.	0.8	1.2	1.6	2.0	2.4	2.8