7-deaza-8-aza-deoxyguanosine (deaza G (PPG)) is a deoxyribonucleoside in which the 7-nitrogen and 8-carbon are flipped. The resulting modified dG is unable to form a hydrogen bond at position 7, but can at position 8, of the base. The result is that the 7-deaza-8-aza-G : C base pair increases the stability of the duplex by about 1 degC in Tm compared with the unmodified G : C base pair (1, 2). Similar to 7-deaza-dG, 7-deaza-8-aza-dG can be used to reduce structural problems posed by G-rich and GC-rich regions. Because such regions can form both intra- and inter-strand non-Watson-Crick hydrogen bonds, they can form highly stable secondary structures (such as G-quadruplex) that effectively prevent generation of PCR products (or even readable DNA sequence) from them (3). Because it cannot form hydrogen bonds at position 7, substitution of 7-deaza-8-aza-dG at certain dG positions in G- or GC-rich oligos slated for use in PCR as either PCR primers or templates reduces the prevalence of these secondary structures, resulting in improved PCR product generation (4).

Furthermore, 7-deaza-8-aza-dG is specifically recommended over 7-deaza-dG whenever multiple insertions of a 7-deaza-dG-type modification into an oligo must be done. This is because 7-deaza-8-aza-dG is stable to the iodine-based oxidizer solution used in phosphoramidite-based DNA synthesis, while 7-deaza-dG is sensitive to it (for more information on the 7-deaza-dG modification, please refer to its technical sheet).

In addition to the above application, because the higher thermodynamic stability improves discrimination of G:A, G:G; and G:T mismatches in DNA duplexes, the 7-deaza-8-aza-dG modification makes the use of G-rich DNA probes a viable option for diagnostic assays (4). References

2. Seela, F.; Driller, H. Alternating d(G-C)3 and d(C-G)3 hexanucleotides containing 7-deaza-2'-deoxyguanosine or 8-aza-7-deaza-2'-deoxyguanosine in place of dG. Nucleic Acids Res. (1989), 17: 901-910.
4. Kutyavin, I.V.; Lokhov, S.