



# Product Specifications

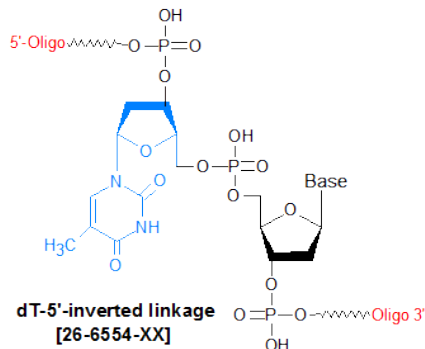
Custom Oligo Synthesis, antisense oligos, RNA oligos, chimeric oligos, Fluorescent dyes, Affinity Ligands, Spacers & Linkers, Duplex Stabilizers, Minor bases, labeled oligos, Molecular Beacons, siRNA, phosphonates Locked Nucleic Acids (LNA); 2'-5' linked Oligos

## Oligo Modifications

For research use only. Not for use in diagnostic procedures for clinical purposes.

### Inverted dT (reverse linkage)

Category	Minor Bases
Modification Code	InvdT
Reference Catalog Number	26-6554
5 Prime	Y
3 Prime	Y
Internal	Y
Molecular Weight(mw)	304.2



Reverse synthesis can be achieved by incorporation modifications where the synthesis orientation can be changed as desired. Oligo can be designed for the production of 5'-5' or 3'-3' linkages or a combination of these in the same oligo. These modified phosphodiester linkage modified oligos are useful in antisense studies, or to synthesize oligonucleotide segments in the opposite sense from normal synthesis, for structural studies.

The CE phosphoramidite of 5'-3' reverse dT has the dimethoxytrityl (DMT) and phosphoramidite groups reversed from the normal case, that is, the DMT-group is attached to the 3'-OH, and the phosphoramidite attached to the 5'-OH, of the ribose. This reverse configuration allows for oligonucleotide synthesis in the 5' to 3' direction (instead of the standard 3' to 5' direction). Reverse synthesis is advisable in the following cases:

- 1. Formation of oligos containing hairpin loops with parallel strands.** Oligos with hairpin loops are used for structural studies into duplex formation. Typically the strands of the stem of the hairpin are anti-parallel. However, by switching to 5'-phosphoramidites for part of the synthesis of such an oligo (for example, initiating the switch during synthesis of the loop portion of the hairpin), the strands of the hairpin stem will be in parallel orientation (1).
- 2. Formation of nuclease resistant (5'-5', 3'-3') linkages.** Anti-sense oligos containing terminal 5'-5' or 3'-3' linkages are highly resistant to exonuclease degradation. For the terminal 5'-5' linkage, the appropriate 5'-phosphoramidite is incorporated at the 5'-end in the final synthesis cycle. For the terminal 3'-3' linkage, the appropriate deoxynucleoside-5'-CPG is used as the solid support for the 3'-end, followed by synthesis of the oligo in the standard 3'-5' direction to make the terminal 3'-3' linkage (2).

Having a single inverted base at the 3' position with a 3'-3' linkage imparts the oligo exonuclease resistance and prevents extension by polymerases as there is no free 3' hydroxyl group to initiate synthesis.

**3. 3'-terminal base/moiety cannot be attached to a CPG.** Examples include 2',3'-ddT or ddl. **References**

1. van de Sande, J.H., Ramsing, N.B., Germann, M.W., Flhorstn, W., Kalisch, B.W., Clegg, R.C., Pon, R.T., Jovin, T.M. Parallel-Stranded DNA. *Science* (1988), **241**: 551-557.
2. Ortigao, J.F.R., Rosch, H., Selter, H., Frohlich, A.

, Lorenz, A., Montenarh, M., Seliger, H. Antisense effect of oligodeoxynucleotides with inverted terminal internucleotidic linkages: a minimal modification protecting against nucleolytic degradation. *Antisense Res. Dev.* (1992), **2**: 129-146.