

## **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.

## Cy7 NHS

Cy7 modification is a post synthesis conjugation to a primary amino group thus an additional modification with an amino group is required. A C6 or C12 amino group can be placed at the 5' or for the 3' end a C3 or C7 amino and for internal positions an amino modified base is used, e.g

Amino dT C6. YIELD NHS based modifications are post synthesis conjugation performed using a primary amino group. The yield is lower as compared to direct automated coupling of modifications that are available as amidites. Approximate yield for various scales are given below.

- ~2 nmol final yield for 50 nmol scale synthesis.
- ~5 nmol final yield for 200 nmol scale synthesis.
- ~16 nmol final yield for 1 umol scale synthesis

Cyanine 7(Cy7) NHS ester is a fluorescent dye that belongs to the Cyanine family of synthetic polymethine dyes. Cy7 is reactive, water-soluble, and has an absorbance maximum of 747 nm and an emission maximum of 776 nm, which is in the near IR. It is available as an NHS ester, and is used to fluorescently label oligonucleotides at either the 5' or 3' end, or internally. Because it is a near IR dye, Cy7 has very little background fluorescence associated with it (1). It is thus an excellent choice for labeling oligo probes slated for in vivo applications, because the minimal scattering and absorption of near-IR photons by cellular tissue ensures higher S/N ratio, and better sensitivity. For example, Fluorescent Resonance Energy Transfer (FRET) oligonucleotide duplexes using Cy5.5 as the donor on one strand and Cy7 as the acceptor on the complementary strand have been used to detect and characterize transcription factor NF-kappaB p50 protein binding to DNA (2)

Caution: Cy7 is intensely colored and very reactive. Care should be exercised when handling the vial containg the C7-labeled oligo to avoid staining clothing, skin, and other items. Also, because Cy7 is in the form of an NHS ester, the oligo first must be synthesized with an Amino C6 Linker (for the ends) or the Amino C6 version of the base phosphoramidite (for internal labeling). The Cy7-NHS ester is then manually attached to the oligo through the amino group in a separate reaction post-synthesis.

Near Infrared Fluorophore Spectral Data & Quencher Selection Guide

Fluorophore Name

Excitation Max, nm +/-10

Emission Max, nm +/-10

Extinction Coefficient\*

Color\*\*





## IRDye 800 NHS 795 819 240,000

 $^*$  Extinction coefficient at  $\lambda$  (max) in cm-1M-1. \*\* Typical emission color seen through the eyepiece of a conventional fluorescence microscope with appropriate filters. Near-IR region. Human vision is insensitive to light beyond ~650 nm; it is not possible to view near-IR fluorescent dyes.

Click here for a list of fluorophores.

Click here for list of quenchers.

References

- 1. Benson, R.C., Kues, H.A. Absorption and Fluorescence Properties of Cyanine Dyes. *J. Chem. Eng. Data* (1977), 22: 379-383.
- 2. Zhang, S., Metelev, V., Tabatadze, D., Zamecnik, P.C., Bogdanov, A. Fluorescence resonance energy transfer in near-infrared fluorescent oligonucleotide probes for detecting protein-DNA interactions. *Proc. Nat. Acad. Sci. USA.* (2008), 105: 4156-4161.

