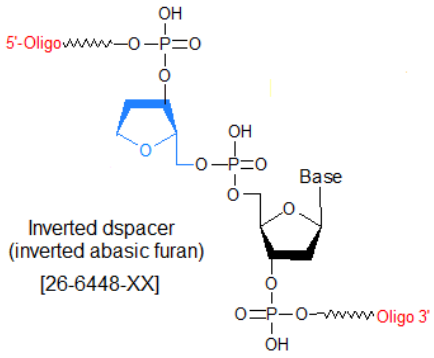
Inverted Abasic Site

Category	Spacers
Modification Code	iB
Reference Catalog Number	26-6448
5 Prime	Y
3 Prime	Y
Internal	Y
Molecular Weight(mw)	180.1



Inverted Abasic Site (dSpacer abasic furan) is primarily used to block the ends of the oligo. it can also be used for structural studies in comparison to abasic furan.

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.

Construct Examples A 5'-NNNNNNNN-3'-3'-NNNNNNNN-5'

The construct shown above starts at the right side in orange font 5' end with an inverted base, towards the left side is the 3' end. This orientation will continue with more sites of the inverted bases. Insertion of a standard bases shown in green font will have a 3'-3' phosphodiester linkage and to the left is the 5' end. B 3'-NNNNNNNN-5'--3'-[Inv-dT]-5'--5'-NNNNNNNN-3'

The construct shown above is with a single [Inv-dT] to signify the orientation change point after the standard bases in green font; chemical synthesis starts from the 3' end. Note ALL bases shown in orange font after the first inverted bases towards the left will also be inverted bases to keep the reverse orientation. C 5'-NNNNNNNN-3'--3'-[Inv-dT]-5'--5'-NNNNNNNN-3'

The same construct is shown above but with standard orientation bases shown in green font inserted after the inverted base, this will reverse the polarity and thus the oligo will have a 5' and a 3' end.

dSpacer (abasic furan) is a tetrahydrofuran derivative, in which a methylene group occupies the 1 position of 2'-deoxyribose. dSpacer is commonly used to mimic an abasic site in an oligonucleotide. In DNA, abasic sites are generated by hydrolysis of the glycosidic linkage to the nucleotide base, leaving just the sugar-phosphate backbone at that position.

In the cell, abasic site formation occurs after a spontaneous depurination/depyrmidination event, by UV ionizing radiation, or as a Base Excision Repair (BER) intermediate (1, 2). Because such sites are fragile, they are easily susceptible to single-stranded/double-stranded breakage, and if not repaired by the BER mechanism, abasic lesions often lead to mutation by translesion synthesis during replication. The particular base incorporated opposite the lesion varies depending on organism and environmental conditions (3).

dSpacer is used as an abasic site mimic in synthetic oligonucleotides because it not only is structurally very similiar to the natural site, but it is considerably more stable, and thus can tolerate the chemical conditions used in oligo synthesis and purification (4).One or more consecutive dSpacer modifications can also be used simply to provide varying amounts of separation between different parts of an oligo sequence. **References**

1. Lindahl, T. Instability and decay of the primary structure of DNA. *Nature.* (1993), **362**: 709-715.
2. Nilsen, H., Krokan, H.E. Base excision repair in a network of defence and tolerance.*Carcinogenesis* (2001), **22**: 987-998.
3. Lehman, A. Replication of damaged DNA by translesion synthesis in human cells. *FEBS Letters.* (2005), **579**: 873-876.
4. Takeshita, M., Chang, C.N., Johnson, F., Will, S., Grollman, A.P. Oligodeoxynucleotides containing synthetic abasic sites. Model substrates for DNA polymerases and apurinic/apyrimidinic endonucleases. *J. Biol. Chem.* (1987), **262**: 10171-10179.