



Products for DNA Research

2019 Catalog of DNA and RNA Monomers

TABLE OF CONTENTS

INTRODUCTION	3
ABOUT US	3
CATALOG	4
STERLING	5
QUALITY AND PERFORMANCE ASSURANCE	5
APPLIED BIOSYSTEMS INSTRUMENTS	6
STERLING CE PHOSPHORAMIDITES	6
STERLING SOLVENTS/REAGENTS	6
STERLING SUPPORTS	7
AB 3900 POLYSTYRENE MODIFIER COLUMNS	9
EXPEDITE™ INSTRUMENTS	10
STERLING CE PHOSPHORAMIDITES	10
STERLING SOLVENTS/REAGENTS	10
STERLING SUPPORTS	11
DNA PHOSPHORAMIDITES - SPECIAL PACKAGING	13
MERMADE INSTRUMENTS	14
STERLING CE PHOSPHORAMIDITES	14
STERLING SOLVENTS/REAGENTS	14
STERLING SUPPORTS	15
GE HEALTHCARE LIFE SCIENCES INSTRUMENTS	16
STERLING CE PHOSPHORAMIDITES	16
STERLING SOLVENTS/REAGENTS	17
DR. OLIGO INSTRUMENTS	18
STERLING CE PHOSPHORAMIDITES	18
STERLING SOLVENTS/REAGENTS	18
STERLING SUPPORTS	19
OLIGONUCLEOTIDE PURIFICATION	19
ALTERNATIVE PROTECTING GROUPS	20
DEPURINATION RESISTANT CE PHOSPHORAMIDITES	20
ULTRAMILD CE PHOSPHORAMIDITES	21
ULTRAMILD SUPPORTS	21
ULTRAMILD SOLVENTS/REAGENTS	21
ULTRAMILD DNA SYNTHESIS	21
SUPPORTS	22
GLEN UNYSUPPORT	22
GLEN UNYSUPPORT FC	23
UNIVERSAL SUPPORT III	24
Q-SUPPORTS	25
HIGH LOAD CPG	27
REAGENTS	28
ALTERNATIVE SOLVENTS/REAGENTS	28
CSO FOR NON-AQUEOUS OXIDATION	30
UNICAP PHOSPHORAMIDITE	30
BACKBONE MODIFICATION	31
SULFURIZING REAGENTS	31
RNA SUPPORTS	32
RNA SUPPORTS FOR 3' MODIFICATION	32

Oligo synthesis success. The first time and every time.

RNA SYNTHESIS	33
TOM-PROTECTED RNA PHOSPHORAMIDITES	33
RNA SUPPORTS FOR TOM RNA SYNTHESIS	33
TBDMS-PROTECTED RNA PHOSPHORAMIDITES	35
RNA PHOSPHORAMIDITES - SPECIAL PACKAGING	35
ULTRAMILD TBDMS RNA PHOSPHORAMIDITES	36
TBDMS RNA SUPPORTS	36
ULTRAMILD SOLVENTS/REAGENTS	37
2'-OME-RNA SYNTHESIS	38
2'-OME-RNA PHOSPHORAMIDITES	38
ULTRAMILD 2'-OME-RNA	39
ULTRAMILD SOLVENTS/REAGENTS	39
2'-OME-RNA SUPPORTS	40
INDEX	42
GENERAL INFORMATION	44
ORDERING	44
DISCOUNTS	44
TERMS AND CONDITIONS OF SALE	44
PATENTS	44

ABOUT US

Glen Research develops, manufactures and markets reagents for oligonucleotide synthesis, modification, labeling and purification. The company serves customers worldwide involved in basic research, diagnostics and therapeutics. Although Glen Research's original mission was to provide state-of-the-art reagents to researchers, the company also began offering standard reagents for oligonucleotide synthesis but with the innovation that every batch was accompanied by a Certificate of Analysis. The analytical techniques and quality criteria used for the evaluation and acceptance of these reagents were to become an industry standard years later. The company is headquartered in Sterling, Virginia. A privately held company, Glen Research was acquired by Maravai LifeSciences in December 2017.

OVER 30 YEARS OF ASSURED QUALITY FOR OLIGO SYNTHESIS

1987 Glen Research was incorporated in the Commonwealth of Virginia	1991 Company awarded SBIR grant for the investigation of large scale oligonucleotide synthesis using H-phosphonate chemistry
1993 Glen Research introduced the Sterling line of products, a new standard of quality for oligonucleotide synthesis	1995 Glen Research negotiated an exclusive agreement to supply 5'-biotin phosphoramidite worldwide
1996 Company negotiated an exclusive license with Gilead Sciences to supply C5-propynyl pyrimidine nucleosides and G-Clamp phosphoramidites	1997 Glen Research moves into a custom built building in Sterling, Virginia
1999 Company awarded patents for a chemical phosphorylation reagent compatible with DMT-ON purification	2002 Company made an agreement with Epoch Biosciences, Inc. to supply their proprietary dyes and nucleosides to the research market
2003 Glen Research negotiated an agreement with GE Healthcare Biosciences Corp. to supply Cyanine Dyes to the research market	2004 Company awarded patents for a truly universal support for oligonucleotide synthesis - US III.
2006 In collaboration with Berry & Associates, Inc., Glen Research awarded patents for pyrrolo-C analogues, fluorescent C analogues	2008 Glen Research obtained a license for the sale of Glen UnySupport from Ionis Pharmaceuticals
2013 In collaboration with Nelson Biotechnologies, Inc., company awarded patent for serinol phosphoramidites and supports	2017 Glen Research is acquired by Maravai LifeSciences

CATALOG

OTHER INSTRUMENT TYPES

All minor bases, RNA products and modifiers are packaged in septum-capped vials suitable for ABI and other instruments. If you would like another type of vial/column add the following to the end of the catalog number.

Monomers For Instrument type	Add
Expedite	E
MerMade	M
Columns For Instrument type	Add
Expedite	E
Applied Biosystems 3900	A
MerMade	M

(Please inquire for availability of vials and columns for other instrument types.)

Welcome to the Glen Research Catalog containing the most complete selection of products for DNA and RNA research. The Table of Contents at the beginning and the Index at the end of the Catalog are the most comprehensive we have produced. There are always limitations to printed catalogs in a fast-moving technology sector and a complete and up-to-date catalog is also maintained on our web site.

All minor bases, modifiers and RNA products are packaged for Applied Biosystems instruments. We can provide vials and columns for a wide variety of other instruments. As shown in the table to the left, we can accommodate catalog numbers for unusual products to fit all popular instruments. The table to the left is reproduced on all relevant spreads of this catalog.

We are unique in conducting a QC test for supports to show the length of oligo that can be prepared before a drop-off in coupling due to steric effects begins to occur. The drop-off point is recorded in the Certificate of Analysis or Analytical Report. Unless otherwise specified, our minor base and modification supports are 1000Å CPG, which results in improved performance and the ability to make much longer oligos. Polystyrene supports are also available for some of our most popular items.

For reasons of quality assurance, we do not transfer powders or oils from stock Applied Biosystems vials to vials for other instruments. Powders may be hygroscopic and electrostatic, making transfer difficult, and oils have to be dissolved and the solvent evaporated. For best performance, it is preferable for the customer to dissolve the product and immediately transfer the solution to the correct instrument vial. Consequently, the product will be delivered in an industry-standard septum-capped vial along with a clean dry vial for the appropriate instrument.

Glen Research's distributors cover a very significant percentage of countries where oligonucleotide synthesis is commonly practiced. Our vast selection of unusual products is really only comprehensively stocked here in Virginia and some of our web viewers have asked us to set up a direct shipping channel. For them, we offer the eGlen program which is described in the following web link: <http://www.glenresearch.com/Reference/eGlen.html>.

Authorized distributors for Glen Research products are listed below. Other countries not listed are covered by direct sales from our Sterling, USA office.

UK and Ireland

Cambio Ltd
Telephone Number: +44 (0) 1954 210200
Fax Number: +44 (0) 1954 210300
e-mail addresses: support@cambio.co.uk and
orders@cambio.co.uk
Website: <http://www.cambio.co.uk/>

China

Beijing LeBo Biotech Co., Ltd
Telephone Number: +86-10-52405563
Fax Number: +86-10-58850899
email address: info@lab-bio.com
Website: <http://www.lab-bio.com/>

Netherlands

Eurogentec b.v.
Telephone Number: +31 43 352 06 98
Fax Number: +31 43 354 19 65
e-mail address: info@eurogentec.com

Nordic and Baltic Countries

BioNordika AS
Telephone Number: +47 23 03 58 00
Fax Number: +47 23 03 58 01
e-mail address: info@bionordika.no
Website: <http://www.bionordika.no/>

Belgium

Eurogentec S.A.
Telephone Number: +32 4 372 74 00
Fax Number: +32 4 372 75 00
e-mail address: info@eurogentec.com
Website: <http://www.eurogentec.com/>

Germany

Eurogentec GmbH
Telephone Number: +49 221 258 94 55
Fax Number: +49 221 258 94 54
e-mail address: info@eurogentec.com

Republic of Korea

Bosung Scientific Co., Ltd.
Telephone Number: +82-02-6105-5630
Fax Number: +82-02-6105-5680
email address: info@bosungsci.com
Website: <https://bosungsci.com/>

Japan

Nihon Techno Service Co., Ltd.
Telephone Number: +81 29 886 6811
Fax Number: +81 29 870 0210
e-mail address: info@ntsbio.com
Website: <http://www.ntsbio.com/>

Israel

Eisenberg Bros. Ltd.
Telephone Number: 972-3-9777000
Fax Number: 972-3-9777001
e-mail address: nicoles@eb1.co.il
Website: <http://www.eisenbros.co.il/>

France

Eurogentec s.a.
Telephone Number: +33 2 41 73 33 73
Fax Number: +33 2 41 73 10 26
e-mail address: info@eurogentec.com

QUALITY AND PERFORMANCE ASSURANCE

Glen Research has developed and implemented a Quality Management System (QMS) designed to enhance customer satisfaction by focusing on processes for continual improvement and on assurance of conformity to customer needs, with full consideration of applicable regulatory requirements.

STERLING QUALITY

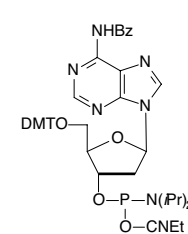
The benchmark for excellence in DNA and RNA synthesis. All Sterling materials must pass stringent purity and identity tests prior to acceptance. Sterling products are formulated, filtered, and packaged in optimal environments using specially cleaned and dried glassware and columns. Color-coded labeling and post-packaging analysis guarantee accuracy and Sterling Quality.



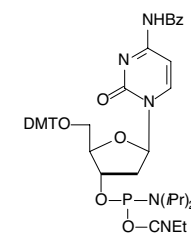
STERLING is a trademark of Glen Research Corporation.

Glen Research offers the highest level of Quality Assurance for reagents for DNA and RNA synthesis - Sterling Quality and Performance. We now apply the Sterling criteria of quality and performance to all of Glen Research's established products.

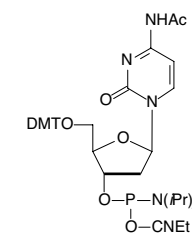
The common monomers and supports, whose structures are illustrated below, are available for the variety of synthesizers listed on the following pages.



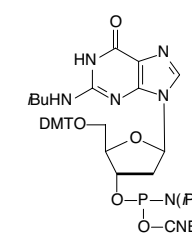
dA-CE Phosphoramidite



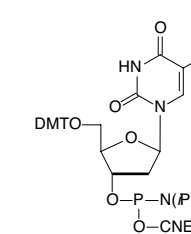
dC-CE Phosphoramidite



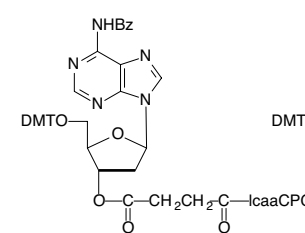
Ac-dC-CE Phosphoramidite



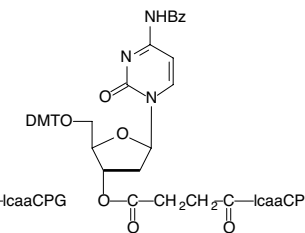
dG-CE Phosphoramidite



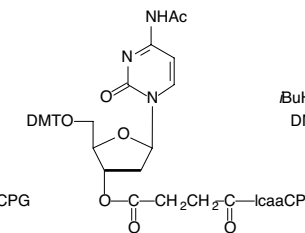
dT-CE Phosphoramidite



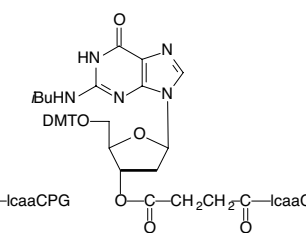
dA-Icaa-CPG



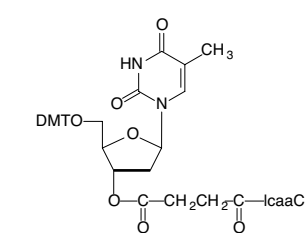
dC-Icaa-CPG



Ac-dC-Icaa-CPG



dG-Icaa-CPG



dT-Icaa-CPG

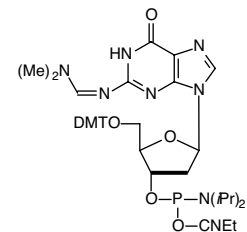


STERLING

STERLING CE PHOSPHORAMIDITES

Glen Research CE (β-cyanoethyl) Phosphoramidites are produced and packaged to ensure the highest performance on DNA synthesizers. Every Glen Research product is accompanied by a Certificate of Analysis and HPLC trace, showing the results of our QC testing. Every Glen Research monomer vial is specially cleaned to eliminate particulate contamination and tested to ensure a tight fit on synthesizers.

Item	Catalog No.	Pack	Price (\$)
dA-CE Phosphoramidite	10-1000-02	0.25g	12.50
	10-1000-05	0.5g	25.00
	10-1000-10	1.0g	50.00
	10-1000-20	2.0g	100.00
	10-1000-40	4.0g	200.00
dC-CE Phosphoramidite	10-1010-02	0.25g	12.50
	10-1010-05	0.5g	25.00
	10-1010-10	1.0g	50.00
	10-1010-20	2.0g	100.00
	10-1010-40	4.0g	200.00
Ac-dC-CE Phosphoramidite	10-1015-02	0.25g	12.50
	10-1015-05	0.5g	25.00
	10-1015-10	1.0g	50.00
	10-1015-20	2.0g	100.00
	10-1015-40	4.0g	200.00
dG-CE Phosphoramidite	10-1020-02	0.25g	12.50
	10-1020-05	0.5g	25.00
	10-1020-10	1.0g	50.00
	10-1020-20	2.0g	100.00
	10-1020-40	4.0g	200.00
dmf-dG-CE Phosphoramidite	10-1029-02	0.25g	12.50
	10-1029-05	0.5g	25.00
	10-1029-10	1.0g	50.00
	10-1029-20	2.0g	100.00
	10-1029-40	4.0g	200.00
dT-CE Phosphoramidite	10-1030-02	0.25g	12.50
	10-1030-05	0.5g	25.00
	10-1030-10	1.0g	50.00
	10-1030-20	2.0g	100.00
	10-1030-40	4.0g	200.00



dmf-dG-CE Phosphoramidite

ABI INSTRUMENTS

- 60mL septum-capped vials used on oldest ABI 380, 381 and 391 instruments. 200mL oxidizer and 450mL deblock screw-capped bottles also used on ABI 380, 381 and 391 instruments.
- Small screw-capped vials used on ABI 392 and 394 instruments.
- Larger screw-capped vials used on ABI 392, 394 and 3400 instruments.
- Large bottles used on ABI 3900 instruments.

SEE ALSO

Depurination Resistant dA on page 20

STERLING CE PHOSPHORAMIDITES (CONT.)

Item	Catalog No.	Pack	Price (\$)
<i>Cap Mix A</i> THF/Pyridine/Ac2O	40-4110-45 ¹	45mL	16.00
	40-4110-52 ²	200mL	30.00
	40-4110-57 ³	450mL	72.00
	40-4110-62 ⁴	2000mL	325.00
<i>Cap Mix B</i> 16% 1-Melm in THF <i>(This Cap B solution is identical to the formulation produced by Applied Biosystems.)</i>	40-4220-45 ¹	45mL	20.00
	40-4220-52 ²	200mL	40.00
	40-4220-62 ⁴	2000mL	425.00
<i>Oxidizing Solution</i> 0.02M I2 in THF/Pyridine/H2O	40-4330-52 ^{1,2}	200mL	30.00
	40-4330-57 ³	450mL	72.00
	40-4330-62 ⁴	2000mL	325.00
<i>Deblocking Mix</i> 3% TCA/DCM	40-4140-57 ^{1,2}	450mL	36.00
	40-4140-62 ^{3,4}	2000mL	144.00

STERLING SUPPORTS

All Glen Research CPG supports use the standard long chain alkylamino (lcaa) linker but differ in the glass pore size, 500Å, 1000Å or 2000Å. The 500Å support is appropriate for shorter sequences, while the 1000Å supports perform better in the synthesis of longer (>30-mer) DNA sequences. The 2000Å support is best for very long (>150-mer) oligonucleotides. We have instituted an additional QC test for supports to show the length of oligo that can be prepared before a drop-off in coupling due to steric effects begins to occur. The drop-off point is recorded in the Certificate of Analysis. All Glen Research supports are fully end-capped to ensure that the CPG surface is totally inert, thereby avoiding the introduction of impurity sequences containing deletions at the 3'-terminus.

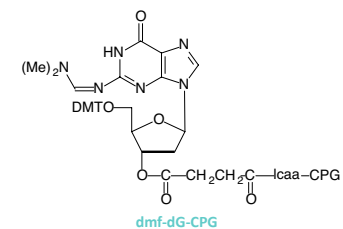
Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Pack	Price(\$)
dA	dC	dG	dT	dA,dC,dG,dT (1 column of each base)	Ac-dC	dmf-dG		

500Å Columns

20-2100-42	20-2110-4	220-2120-42	20-2130-42	20-2140-42	20-2113-42	4x0.2µm	40.00
20-2100-41	20-2110-41	20-2120-41	20-2130-41	20-2140-41	20-2113-41	4x1.0µm	60.00
20-2100-13	20-2110-13	20-2120-13	20-2130-13		20-2113-13	1x10µm	100.00

1000Å Columns

20-2101-45	20-2111-45	20-2121-45	20-2131-45	20-2141-45	20-2115-45	20-2129-45	4x40nm	40.00
20-2101-42	20-2111-42	20-2121-42	20-2131-42	20-2141-42	20-2115-42	20-2129-42	4x0.2µm	40.00
20-2101-41	20-2111-41	20-2121-41	20-2131-41	20-2141-41	20-2115-41	20-2129-41	4x1.0µm	60.00
20-2101-13	20-2111-13	20-2121-13	20-2131-13		20-2115-13	20-2129-13	1x10µm	100.00



dmf-dG-CPG

ABBREVIATIONS

- Ac₂O = Acetic Anhydride
- CE = Cyanoethyl
- CPG = Controlled Pore Glass
- DCM = Dichloromethane
- dmf = dimethylformamide
- I₂ = Iodine
- lcaa = long chain alkylamino
- Melm = 1-Methylimidazole
- µm = micromole(s)
- nm = nanomole(s)
- TCA = Trichloroacetic Acid
- THF = Tetrahydrofuran

SEE ALSO

Alternative Solvents on page 28

STERLING SUPPORTS (CONT.)

Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Pack	Price(\$)
dA	dC	dG	dT	dA,dC,dG,dT (1 column of each base)	Ac-dC	dmf-dG		
2000Å Columns								
20-2102-42	20-2112-42	20-2122-42	20-2132-42	20-2142-42			4x0.2µm	40.00
Low Volume (LV) Polystyrene Columns								
26-2100-45	26-2110-45	26-2120-45	26-2130-45	26-2140-45			4x40nm	48.00
26-2100-42	26-2110-42	26-2120-42	26-2130-42	26-2140-42			4x0.2µm	48.00
AB 3900 Polystyrene Columns								
26-2600-65	26-2610-65		26-2630-65		26-2629-65	200x40nm		825.00
26-2600-62	26-2610-62		26-2630-62		26-2629-62	200x200nm		825.00
AB 3900 1000Å CPG Columns								
20-2101-65			20-2131-65		20-2115-65	20-2129-65	200x40nm	600.00
20-2101-62			20-2131-62		20-2115-62	20-2129-62	200x200nm	650.00
20-2101-61			20-2131-61		20-2115-61	20-2129-61	200x1.0µm	875.00
500Å Bulk CPG								
20-2000-01	20-2010-01	20-2020-01	20-2030-01		20-2013-01		0.1g	9.00
20-2000-02	20-2010-02	20-2020-02	20-2030-02		20-2013-02		0.25g	20.00
20-2000-10	20-2010-10	20-2020-10	20-2030-10		20-2013-10		1.0g	75.00
1000Å Bulk CPG								
20-2001-01	20-2011-01	20-2021-01	20-2031-01		20-2015-01	20-2029-01	0.1g	9.00
20-2001-02	20-2011-02	20-2021-02	20-2031-02		20-2015-02	20-2029-02	0.25g	20.00
20-2001-10	20-2011-10	20-2021-10	20-2031-10		20-2015-10	20-2029-10	1.0g	75.00
2000Å Bulk CPG								
20-2002-01	20-2012-01	20-2022-01	20-2032-01				0.1g	15.00
20-2002-02	20-2012-02	20-2022-02	20-2032-02				0.25g	30.00
20-2002-10	20-2012-10	20-2022-10	20-2032-10				1.0g	105.00

Item	Catalog No.	Pack	Price (\$)
Empty Synthesis Columns-TWIST 40nm, 0.2um or 1um	20-0030-00	Pack of 10	60.00
Empty Synthesis Columns - TWIST 10um/15um	20-0040-00	Pack of 10	300.00
Replacement Frits - TWIST 10um/15um	20-0040-0F	Pack of 20	30.00

Product structures are shown in page 5. TWIST is a trademark of Glen Research Corporation.

AB 3900 POLYSTYRENE MODIFIER COLUMNS

Some of our more popular minor base and modifier supports are available on polystyrene in columns fully compatible with the Applied Biosystems 3900 synthesizer. These include our popular Universal Support III, which will allow DNA, RNA or LNA oligos to be produced on the 3900 with ANY base at the 3' terminus. At the same time, we are offering 1 µmole columns of Universal Support III for the 3900 instrument. Structures and more complete descriptions are found in the relevant catalog sections for each item. AB 3900 columns can be prepared with virtually any of the CPG supports in this catalog. It is no longer necessary to adjust the flow using our AB 3900 CPG columns, as noted in the box to the right. Modified CPG columns are only available in 200 nmole size - simple add 'A' to the regular catalog number to order.

Item	Catalog No.	Pack	Price (\$)
Universal Support III PS			
200 nmole columns	26-5110-52	Pack of 10	100.00
40 nmole columns (AB 3900 Format)	26-5110-55	Pack of 10	100.00
Glen UnySupport™ PS			
200 nmole columns	26-5140-52	Pack of 10	100.00
40 nmole columns	26-5140-55	Pack of 10	100.00
3'-Phosphate PS			
200 nmole columns	26-2900-52	Pack of 10	150.00
40 nmole columns	26-2900-55	Pack of 10	150.00
3'-PT-Amino-Modifier C6 PS			
200 nmole columns	26-2956-52	Pack of 10	220.00
40 nmole columns	26-2956-55	Pack of 10	220.00
3'-(6-FAM) PS			
200 nmole columns	26-2961-52	Pack of 10	300.00
40 nmole columns	26-2961-55	Pack of 10	300.00
3'-DabcyI PS			
200 nmole columns	26-5912-52	Pack of 10	300.00
40 nmole columns	26-5912-55	Pack of 10	300.00
3'-TAMRA PS			
200 nmole columns	26-5910-52	Pack of 10	300.00
40 nmole columns	26-5910-55	Pack of 10	300.00
3'-BiotinTEG PS			
200 nmole columns	26-2955-52	Pack of 10	300.00
40 nmole columns	26-2955-55	Pack of 10	300.00

SEE ALSO
Universal Supports on page 22

AB 3900 1000Å CPG COLUMNS
Glen Research's AB 3900 1000Å CPG columns bring the lower cost of CPG to this platform while maintaining the high synthesis efficiency of 1000Å CPG. Our columns offer the following key attributes:

- No need to change instrument settings
- No need to change software parameters
- Easier handling post-synthesis compared to PS
- High quality 1000Å CPG for optimal synthesis results

STERLING CE PHOSPHORAMIDITES

Glen Research CE (β-cyanoethyl) Phosphoramidites are produced and packaged to ensure the highest performance on DNA synthesizers. Every Glen Research product is accompanied by a Certificate of Analysis and HPLC trace, showing the results of our QC testing. Every Glen Research monomer vial is specially cleaned to eliminate particulate contamination.

Item	Catalog No.	Pack	Price (\$)
dA-CE Phosphoramidite	10-1000-C2	0.25g	12.50
	10-1000-C5	0.5g	25.00
	10-1000-1C	1.0g	50.00
	10-1000-2C	2.0g	100.00
dC-CE Phosphoramidite	10-1010-C2	0.25g	12.50
	10-1010-C5	0.5g	25.00
	10-1010-1C	1.0g	50.00
	10-1010-2C	2.0g	100.00
Ac-dC-CE Phosphoramidite	10-1015-C2	0.25g	12.50
	10-1015-C5	0.5g	25.00
	10-1015-1C	1.0g	50.00
	10-1015-2C	2.0g	100.00
dG-CE Phosphoramidite	10-1020-C2	0.25g	12.50
	10-1020-C5	0.5g	25.00
	10-1020-1C	1.0g	50.00
	10-1020-2C	2.0g	100.00
dmf-dG-CE Phosphoramidite	10-1029-C2	0.25g	12.50
	10-1029-C5	0.5g	25.00
	10-1029-1C	1.0g	50.00
	10-1029-2C	2.0g	100.00
dT-CE Phosphoramidite	10-1030-C2	0.25g	12.50
	10-1030-C5	0.5g	25.00
	10-1030-1C	1.0g	50.00
	10-1030-2C	2.0g	100.00

STERLING SOLVENTS/REAGENTS

All solvents and reagents are prepared to our exacting specifications to ensure the highest synthesis efficiency and are passed through a 0.2 micron filter during packaging to eliminate particulate contamination. Glen Research uses freshly sublimed 1H-tetrazole for premium performance on Expedite synthesizers. Crystalline tetrazole solutions have been discontinued.

Item	Catalog No.	Pack	Price (\$)
Activator Tetrazole in Acetonitrile	30-3102-66 ¹	60mL	50.00
	30-3102-52 ²	200mL	100.00
	30-3100-57 ²	450mL	200.00
Diluent Acetonitrile, anhydrous	40-4050-45	60mL	12.00
	40-4050-50	100mL	16.00

STERLING SOLVENTS/REAGENTS (CONT.)

Item	Catalog No.	Pack	Price (\$)
Anhydrous Wash Acetonitrile, anhydrous	40-4050-53 ¹	300mL	40.00
	40-4050-57 ²	450mL	50.00
Cap Mix A THF/Ac2O	40-4012-66 ¹	60mL	15.00
	40-4012-52 ²	200mL	30.00
	40-4012-57 ²	450mL	72.00
Cap Mix B 10% 1-Melm in THF/Pyridine	40-4122-66 ¹	60mL	20.00
	40-4122-52 ²	200mL	40.00
	40-4122-57 ²	450mL	96.00
Oxidizing Solution 0.02M I2 in THF/H2O/Pyridine	40-4132-66 ¹	60mL	20.00
	40-4132-52 ²	200mL	40.00
	40-4132-57 ²	450mL	96.00
Deblocking Mix 3% TCA/DCM	40-4140-68 ¹	180mL	18.00
	40-4140-71 ²	1L	80.00

STERLING SUPPORTS

All Glen Research supports use the standard long chain alkylamino (Icaa) linker but differ in the glass pore size, 500Å, 1000Å or 2000Å. The 500Å support is appropriate for shorter sequences, while the 1000Å supports perform better in the synthesis of longer (>30-mer) DNA sequences. The 2000Å support is best for very long (>150-mer) oligonucleotides. We have instituted an additional QC test for supports to show the length of oligo that can be prepared before a drop-off in coupling due to steric effects begins to occur. The drop-off point is recorded in the Certificate of Analysis. All Glen Research supports are fully end-capped to ensure that the CPG surface is totally inert, thereby avoiding the introduction of impurity sequences containing deletions at the 3'-terminus.

Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Pack	Price(\$)
dA	dC	dG	dT	dA,dC,dG,dT (1 column of each base)	Ac-dC	dmf-dG		
500Å Columns								
20-2200-42	20-2210-42	20-2220-42	20-2230-42	20-2240-42	20-2213-42		4x0.2µm	40.00
20-2200-41	20-2210-41	20-2220-41	20-2230-41	20-2240-41	20-2213-41		4x1.0µm	60.00
20-2200-14	20-2210-14	20-2220-14	20-2230-14		20-2213-14		1x15µm	150.00
1000Å Columns								
20-2201-45	20-2211-45	20-2221-45	20-2231-45	20-2241-45	20-2215-45	20-2229-45	4x40nm	40.00
20-2201-42	20-2211-42	20-2221-42	20-2231-42	20-2241-42	20-2215-42	20-2229-42	4x0.2µm	40.00
20-2201-41	20-2211-41	20-2221-41	20-2231-41	20-2241-41	20-2215-41	20-2229-41	4x1.0µm	60.00
20-2201-14	20-2211-14	20-2221-14	20-2231-14		20-2215-14	20-2229-14	1x15µm	150.00

ABBREVIATIONS

Ac₂O = Acetic Anhydride
 CE = Cyanoethyl
 CPG = Controlled Pore Glass
 DCM = Dichloromethane
 dmf = dimethylformamide
 I₂ = Iodine
 Icaa = long chain alkylamino
 Melm = 1-Methylimidazole
 µm = micromole(s)
 nm = nanomole(s)
 TCA = Trichloroacetic Acid
 THF = Tetrahydrofuran

SEE ALSO

[Alternative Solvents on page 28](#)

BULK CPG LOADING

500Å supports 35-50µmoles/g
 1000Å supports 25-40µmoles/g

QUALITY ASSURANCE

Every batch of these CE Phosphoramidites is tested as follows:

- HPLC**
a) Identity is confirmed by comparison with a reference sample.
b) Purity is determined by HPLC to be ≥98.0%.
- TLC**
Purity is verified by TLC.
- ³¹P NMR**
Purity is determined by ³¹P NMR to be ≥98%.
- Coupling Test**
Coupling efficiency is determined to be ≥99%.
- Solution Test**
A 0.1M solution is determined to be clear and free of particulate contamination.
- Loss on Drying**
Volatile contaminants are determined to be ≤2%.

SEE ALSO

[Depurination Resistant dA on page 20](#)

STERLING SUPPORTS (CONT.)

Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Pack	Price(\$)
dA	dC	dG	dT	dA,dC,dG,dT (1 column of each base)	Ac-dC	dmf-dG		
2000Å Columns								
20-2202-42	20-2212-42	20-2222-42	20-2232-42	20-2242-42			4x0.2µm	40.00
500Å Bulk CPG								
20-2000-01	20-2010-01	20-2020-01	20-2030-01		20-2013-01		0.1g	9.00
20-2000-02	20-2010-02	20-2020-02	20-2030-02		20-2013-02		0.25g	20.00
20-2000-10	20-2010-10	20-2020-10	20-2030-10		20-2013-10		1.0g	75.00
1000Å Bulk CPG								
20-2001-01	20-2011-01	20-2021-01	20-2031-01		20-2015-01	20-2029-01	0.1g	9.00
20-2001-02	20-2011-02	20-2021-02	20-2031-02		20-2015-02	20-2029-02	0.25g	20.00
20-2001-10	20-2011-10	20-2021-10	20-2031-10		20-2015-10	20-2029-10	1.0g	75.00
2000Å Bulk CPG								
20-2002-01	20-2012-01	20-2022-01	20-2032-01				0.1g	15.00
20-2002-02	20-2012-02	20-2022-02	20-2032-02				0.25g	30.00
20-2002-10	20-2012-10	20-2022-10	20-2032-10				1.0g	105.00

SEE ALSO

Universal Supports on page 22
Q-Supports on page 25
High Load Supports on page 27

Item	Catalog No.	Pack	Price (\$)
Empty Synthesis Columns, 40nm, 0.2µm Expedite Style	20-0021-02	Pack of 10	48.00
Empty Synthesis Columns, 1µm Expedite Style	20-0021-01	Pack of 10	48.00
Replacement Filters-Expedite	20-0021-0F	Pack of 20	20.00
Empty Synthesis Columns - TWIST 10µm/15µm	20-0040-00	Pack of 10	300.00
Replacement Frits - TWIST 10µm/15µm	20-0040-0F	Pack of 20	30.00

Product structures are shown in page 5. TWIST is a trademark of Glen Research Corporation. Expedite is a trademark of Applied Biosystems.

DNA PHOSPHORAMIDITES - SPECIAL PACKAGING

We offer our high quality DNA phosphoramidites specifically packaged for high throughput and large-scale synthesis customers. These customers normally require high quality materials produced under the guidelines of a validated quality management system while still being priced aggressively. These products include the usual Glen Research certification and guarantees and they are available in larger packs or in bulk. The core catalog numbers for regular DNA phosphoramidites are shown below. For these products, please request a quote.

Item	Catalog No.	Pack	Price (\$)
dA-CE Phosphoramidite	10-1000-SP		
dC-CE Phosphoramidite	10-1010-SP		
Ac-dC-CE Phosphoramidite	10-1015-SP		
dG-CE Phosphoramidite	10-1020-SP		
dmf-dG-CE Phosphoramidite	10-1029-SP		
dT-CE Phosphoramidite	10-1030-SP		

INSTRUMENT TYPES

Glen Research packages these monomers in a variety of industry-standard vials and bottles. Please provide the exact specification of the bottle required prior to receiving a quotation.

STERLING CE PHOSPHORAMIDITES

MerMade synthesizers belong to a family of synthesizers, including the column-based MerMade 4, MerMade 6 and 12 instruments and the parallel array synthesizers, MerMade 192 and MerMade 192E, manufactured by BioAutomation Corporation in Plano, TX. Their web site can be found at: <http://www.BioAutomation.com>. Phosphoramidite monomers are packaged in 30mL and 240mL amber bottles for dissolving at a concentration of 1g/20mL and are connected directly to the instrument. Some instruments may also be configured to accept Applied Biosystems serum vials, as shown on page 6.

Item	Catalog No.	Pack	Price (\$)
dA-CE Phosphoramidite	10-1000-02M	0.25g	12.50
	10-1000-05M	0.5g	25.00
	10-1000-10M	1.0g	50.00
	10-1000-5S	5.0g	250.00
	10-1000-1S	10.0g	500.00
dC-CE Phosphoramidite	10-1010-02M	0.25g	12.50
	10-1010-05M	0.5g	25.00
	10-1010-10M	1.0g	50.00
	10-1010-5S	5.0g	250.00
	10-1010-1S	10.0g	500.00
Ac-dC-CE Phosphoramidite	10-1015-02M	0.25g	12.50
	10-1015-05M	0.5g	25.00
	10-1015-10M	1.0g	50.00
	10-1015-5S	5.0g	250.00
	10-1015-1S	10.0g	500.00
dG-CE Phosphoramidite	10-1020-02M	0.25g	12.50
	10-1020-05M	0.5g	25.00
	10-1020-10M	1.0g	50.00
	10-1020-5S	5.0g	250.00
	10-1020-1S	10.0g	500.00
dmf-dG-CE Phosphoramidite	10-1029-02M	0.25g	12.50
	10-1029-05M	0.5g	25.00
	10-1029-10M	1.0g	50.00
	10-1029-5S	5.0g	250.00
	10-1029-1S	10.0g	500.00
dT-CE Phosphoramidite	10-1030-02M	0.25g	12.50
	10-1030-05M	0.5g	25.00
	10-1030-10M	1.0g	50.00
	10-1030-5S	5.0g	250.00
	10-1030-1S	10.0g	500.00

STERLING SOLVENTS/REAGENTS

All solvents and reagents are prepared to our exacting specifications to ensure the highest synthesis efficiency and are passed through a 0.2 micron filter during packaging to eliminate particulate contamination. Parallel synthesizers typically use 5-ethylthio-1H-tetrazole (ETT) as activator to minimize the chance of crystallization. ETT is used at a concentration of 0.25M in acetonitrile, which is far below the level at which crystallization may occur.

Item	Catalog No.	Pack	Price (\$)
Activator 0.25M 5-Ethylthio-1H-Tetrazole in Acetonitrile	30-3140-57	450mL	200.00
	30-3140-61	960mL	365.00
	30-3140-62	2000mL	760.00

QUALITY ASSURANCE

- Every batch of these CE Phosphoramidites is tested as follows:
- HPLC**
 - Identity is confirmed by comparison with a reference sample.
 - Purity is determined by HPLC to be $\geq 98.0\%$.
 - TLC**

Purity is verified by TLC.
 - ^{31}P NMR**

Purity is determined by ^{31}P NMR to be $\geq 98\%$.
 - Coupling Test**

Coupling efficiency is determined to be $\geq 99\%$.
 - Solution Test**

A 0.1M solution is determined to be clear and free of particulate contamination.
 - Loss on Drying**

Volatile contaminants are determined to be $\leq 2\%$.

SEE ALSO

Depurination Resistant dA on page 20

SEE ALSO

Alternative Activators on page 28

STERLING SOLVENTS/REAGENTS (CONT.)

Item	Catalog No.	Pack	Price (\$)
Diluent Acetonitrile, anhydrous	40-4050-50	100mL	16.00
Cap Mix A THF/2,6-Lutidine/Ac2O	40-4010-57	450mL	72.00
	40-4010-61	960mL	154.00
	40-4010-62	2000mL	325.00
Cap Mix B 16% 1-Melm in THF	40-4220-57	450mL	96.00
	40-4220-61	960mL	204.00
	40-4220-62	2000mL	425.00
Oxidizing Solution 0.02M I2 in THF/Pyridine/H2O	40-4330-57	450mL	72.00
	40-4330-61	960mL	154.00
	40-4330-62	2000mL	325.00
Deblocking Mix 3% Dichloroacetic acid in DCM	40-4040-57	450mL	36.00
	40-4040-61	960mL	75.00
	40-4040-62	2000mL	144.00
	40-4140-57	450mL	36.00
	40-4140-61	960mL	75.00
3% TCA/DCM	40-4140-62	2000mL	144.00

STERLING SUPPORTS

Columns containing 1000Å CPG are available in packs of 200 to fit MerMade plates. Regular 500Å or 1000Å supports, listed on page 8, may also be used to fill the wells of regular 96 well plates. However, this requires each plate to be prepared with each nucleoside accurately in all wells. A universal support clearly removes the need for four specific supports and makes preparing plates straightforward. Glen UnySupport™ 40 nmole frits, as described on page 22, can also be used.

Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Pack	Price (\$)
dA	dC	dG	dT	Ac-dC	dmf-dG		
Mermade 1000Å Columns							
20-2001-65		20-2021-65	20-2031-65	20-2015-65	20-2029-65	200x50nm	750.00
20-2001-62		20-2021-62	20-2031-62	20-2015-62	20-2029-62	200x200nm	750.00
20-2001-61		20-2021-61	20-2031-61	20-2015-61	20-2029-61	48x1.0µm	300.00

Item	Catalog No.	Pack	Price (\$)
Glen UnySupport™ 1000 1 µmole columns 200 nmole columns 40 nmole columns	20-5141-91	Pack of 96	375.00
	20-5141-92	Pack of 96	250.00
	20-5141-95	Pack of 96	250.00
Empty MerMade Columns Empty MerMade Columns (50nm) Empty MerMade Columns (200nm and 1µm)	20-0050-05	Pack of 48	200.00
	20-0050-02	Pack of 48	200.00

ABBREVIATIONS

- Ac₂O = Acetic Anhydride
- CE = Cyanoethyl
- CPG = Controlled Pore Glass
- DCM = Dichloromethane
- dmf = dimethylformamide
- I₂ = Iodine
- Melm = 1-Methylimidazole
- TCA = Trichloroacetic Acid
- THF = Tetrahydrofuran

SEE ALSO

Alternative Solvents on page 28

SEE ALSO

Universal Supports on page 22
Q-Supports on page 25
High Load Supports on page 27

STERLING CE PHOSPHORAMIDITES

Glen Research CE (β-cyanoethyl) Phosphoramidites are produced and packaged to ensure the highest performance on DNA synthesizers. Every Glen Research product is accompanied by a Certificate of Analysis and HPLC trace, showing the results of our QC testing. Every Glen Research monomer vial is specially cleaned to eliminate particulate contamination.

Item	Catalog No.	Pack	Price (\$)
ÅKTA oligopilot dA-CE Phosphoramidite	10-1000-20	2.0g	100.00
	10-1000-50	5.0g	250.00
dC-CE Phosphoramidite	10-1010-20	2.0g	100.00
	10-1010-50	5.0g	250.00
Ac-dC-CE Phosphoramidite	10-1015-20	2.0g	100.00
	10-1015-50	5.0g	250.00
dG-CE Phosphoramidite	10-1020-20	2.0g	100.00
	10-1020-50	5.0g	250.00
dmf-dG-CE Phosphoramidite	10-1029-20	2.0g	100.00
	10-1029-50	5.0g	250.00
dT-CE Phosphoramidite	10-1030-20	2.0g	100.00
	10-1030-50	5.0g	250.00

QUALITY ASSURANCE

Every batch of these CE Phosphoramidites is tested as follows:

- HPLC**
a) Identity is confirmed by comparison with a reference sample.
b) Purity is determined by HPLC to be ≥98.0%.
- TLC**
Purity is verified by TLC.
- ³¹P NMR**
Purity is determined by ³¹P NMR to be ≥98%.
- Coupling Test**
Coupling efficiency is determined to be ≥99%.
- Solution Test**
A 0.1M solution is determined to be clear and free of particulate contamination.
- Loss on Drying**
Volatile contaminants are determined to be ≤2%.

SEE ALSO

Depurination Resistant dA on page 20

STERLING SOLVENTS/REAGENTS

All solvents and reagents are prepared to our exacting specifications to ensure the highest synthesis efficiency and are passed through a 0.2 micron filter during packaging to eliminate particulate contamination.

Item	Catalog No.	Pack	Price (\$)
Diluent Acetonitrile, anhydrous	40-4050-45	60mL	12.00
	40-4050-50	100mL	16.00
ÅKTA oligopilot			
Activator 0.40M Tetrazole in Acetonitrile	30-3105-71	1L	380.00
	Cap Mix A Acetonitrile/Melm		
Cap Mix B* Acetonitrile/Ac2O/Lutidine			40-4028-71
Oxidizing Solution 0.05M I2 in Pyridine/H2O			40-4035-71
Deblocking Mix 3% Dichloroacetic acid in DCM			40-4040-71
3% TCA/DCM			40-4140-71
3% DCA in Toluene			40-4240-71

ABBREVIATIONS

Ac₂O = Acetic Anhydride
 CE = Cyanoethyl
 CPG = Controlled Pore Glass
 DCA = Dichloroacetic Acid
 DCM = Dichloromethane
 I₂ = Iodine
 Melm = 1-Methylimidazole
 μm = micromole(s)

SEE ALSO

Alternative Solvents on page 28

* Cap Mix B is a two part formulation that is combined immediately before shipment.

STERLING CE PHOSPHORAMIDITES

Dr. Oligo synthesizers belong to a family of synthesizers, including the parallel array synthesizers, Dr. Oligo 96, Dr. Oligo 192, Dr. Oligo 384 and Dr. Oligo 768, manufactured by Biolytic® Lab Performance, Inc. in Fremont, CA. Their web site can be found at: <http://www.biolytic.com>. Phosphoramidite monomers are packaged in 30mL and 240mL amber bottles for dissolving at a concentration of 1g/20mL and are connected directly to the instrument. Some instruments may also be configured to accept Applied Biosystems serum vials, as shown on page 6.

Item	Catalog No.	Pack	Price (\$)
dA-CE Phosphoramidite	10-1000-02M	0.25g	12.50
	10-1000-05M	0.5g	25.00
	10-1000-10M	1.0g	50.00
	10-1000-5S	5.0g	250.00
	10-1000-1S	10.0g	500.00
dC-CE Phosphoramidite	10-1010-02M	0.25g	12.50
	10-1010-05M	0.5g	25.00
	10-1010-10M	1.0g	50.00
	10-1010-5S	5.0g	250.00
	10-1010-1S	10.0g	500.00
Ac-dC-CE Phosphoramidite	10-1015-02M	0.25g	12.50
	10-1015-05M	0.5g	25.00
	10-1015-10M	1.0g	50.00
	10-1015-5S	5.0g	250.00
	10-1015-1S	10.0g	500.00
dG-CE Phosphoramidite	10-1020-02M	0.25g	12.50
	10-1020-05M	0.5g	25.00
	10-1020-10M	1.0g	50.00
	10-1020-5S	5.0g	250.00
	10-1020-1S	10.0g	500.00
dmf-dG-CE Phosphoramidite	10-1029-02M	0.25g	12.50
	10-1029-05M	0.5g	25.00
	10-1029-10M	1.0g	50.00
	10-1029-5S	5.0g	250.00
	10-1029-1S	10.0g	500.00
dT-CE Phosphoramidite	10-1030-02M	0.25g	12.50
	10-1030-05M	0.5g	25.00
	10-1030-10M	1.0g	50.00
	10-1030-5S	5.0g	250.00
	10-1030-1S	10.0g	500.00

STERLING SOLVENTS/REAGENTS

All solvents and reagents are prepared to our exacting specifications to ensure the highest synthesis efficiency and are passed through a 0.2 micron filter during packaging to eliminate particulate contamination. Parallel synthesizers typically use 5-ethylthio-1H-tetrazole (ETT) as activator to minimize the chance of crystallization. ETT is used at a concentration of 0.25M in acetonitrile, which is far below the level at which crystallization may occur.

Item	Catalog No.	Pack	Price (\$)
<i>Activator</i> 0.25M 5-Ethylthio-1H-Tetrazole in Acetonitrile	30-3140-57	450mL	200.00
	30-3140-62	2000mL	760.00

STERLING SOLVENTS/REAGENTS (CONT.)

Item	Catalog No.	Pack	Price (\$)
<i>Diluent</i> Acetonitrile, anhydrous	40-4050-50	100mL	16.00
<i>Cap Mix A</i> THF/2,6-Lutidine/Ac2O	40-4010-57	450mL	72.00
	40-4010-62	2000mL	325.00
<i>Cap Mix B</i> 16% 1-Melm in THF	40-4220-57	450mL	96.00
	40-4220-62	2000mL	425.00
<i>Oxidizing Solution</i> 0.02M I2 in THF/Pyridine/H2O	40-4330-57	450mL	72.00
	40-4330-62	2000mL	325.00
<i>Deblocking Mix</i> 3% Dichloroacetic acid in DCM	40-4040-57	450mL	36.00
	40-4040-62	2000mL	144.00
	40-4140-57	450mL	36.00
	40-4140-62	2000mL	144.00

STERLING SUPPORTS

Dr. Oligo instruments are designed for flexibility in the use of supports and columns. They can use fritted plates with loose CPG (page 8) and AB 3900 style polystyrene and CPG columns. Glen UnySupport™ 40 nmole frits can also be used.

Dr. Oligo instruments are designed for flexibility in the use of supports and columns. They can use fritted plates with loose CPG (page 8) and AB 3900 style polystyrene and CPG columns. Glen UnySupport™ 40 nmole frits can also be used.

Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Pack	Price(\$)
dA	dC	dG	dT	Ac-dC	dmf-dG		
<i>AB 3900 Polystyrene Columns</i>							
26-2600-65	26-2610-65		26-2630-65		26-2629-65	200x40nm	825.00
26-2600-62	26-2610-62		26-2630-62		26-2629-62	200x200nm	825.00
<i>AB 3900 1000Å CPG Columns</i>							
20-2101-65			20-2131-65	20-2115-65	20-2129-65	200x40nm	600.00
20-2101-62			20-2131-62	20-2115-62	20-2129-62	200x200nm	650.00
20-2101-61			20-2131-61	20-2115-61	20-2129-61	200x1.0µm	875.00

OLIGONUCLEOTIDE PURIFICATION

Biolytic Labs. also offers the innovative Dr. Oligo Processor for high throughput purification of oligonucleotides using Glen-Pak™ DNA Purification Cartridges: <https://www.biolytic.com/p-6814-dr-oligo-processor-fully-automated.aspx>.

QUALITY ASSURANCE

Every batch of these CE Phosphoramidites is tested as follows:

- HPLC**
 - Identity is confirmed by comparison with a reference sample.
 - Purity is determined by HPLC to be ≥98.0%.
- TLC**

Purity is verified by TLC.
- ³¹P NMR**

Purity is determined by ³¹P NMR to be ≥98%.
- Coupling Test**

Coupling efficiency is determined to be ≥99%.
- Solution Test**

A 0.1M solution is determined to be clear and free of particulate contamination.
- Loss on Drying**

Volatile contaminants are determined to be ≤2%.

SEE ALSO

Depurination Resistant dA on page 20

SEE ALSO

Alternative Activators on page 28

ABBREVIATIONS

Ac₂O = Acetic Anhydride
 CE = Cyanoethyl
 CPG = Controlled Pore Glass
 DCM = Dichloromethane
 dmf = dimethylformamide
 I₂ = Iodine
 Melm = 1-Methylimidazole
 TCA = Trichloroacetic Acid
 THF = Tetrahydrofuran

SEE ALSO

Alternative Solvents on page 28

SEE ALSO

Universal Supports on page 22
Q-Supports on page 25
High Load Supports on page 27
Glen-Pak™ DNA on page 147

DEPURINATION RESISTANT CE PHOSPHoramidites

Depurination is defined as the cleavage of the glycosidic bond attaching a purine base to the sugar moiety. Electron withdrawing acyl protecting groups like benzoyl and isobutyryl on the purine amino group(s) destabilize the glycosidic bond, whereas electron donating formamidine protecting groups stabilize the glycosidic bond. The consequence of depurination during oligonucleotide synthesis is the loss of the purine base to form an internucleotide linkage containing the abasic sugar at that position. This site is stable during further synthesis cycles but, upon deprotection with basic reagents, the oligonucleotide is cleaved at that position leading to two shorter fragments. The fragment towards the 5' terminus still contains the DMT group. If DMT-ON purification is being used, the depurinated fragments are co-purified along with the full length product as truncated oligonucleotides.

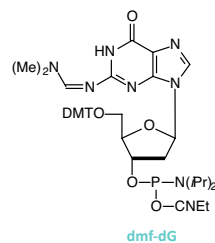
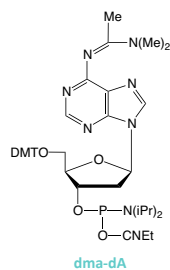
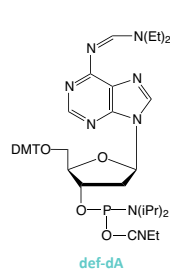
The most commonly used dA-CE Phosphoramidite containing benzoyl protecting groups suffers substantial degradation by depurination after excessive exposure to TCA. At the same time, two depurination resistant dA monomers, protected with diethylformamidine (def) and dimethylacetamidine (dma), are essentially stable to depurination during the same exposure to TCA.

Both new depurination resistant dA monomers (def and dma protected), were rapidly deprotected in ammonium hydroxide and are fully compatible with regular deprotection strategies. Def-protected-dA was rapidly deprotected with AMA at 65° in 20 minutes, which makes it fully compatible with regular AMA deprotection. In contrast, the dma-protected-dA required 80 minutes with AMA at 65° for complete deprotection.

Dmf-dG is also a depurination resistant CE Phosphoramidite with the isobutyryl group of the original monomer replaced with dimethylformamidine (dmf).

Although depurination does occur in regular oligonucleotide synthesis, the degradation is at an extremely low level. However in certain other circumstances, depurination may become more significant, such as synthesis of long oligos, chip-based synthesis, and large-scale synthesis

Item	Catalog No.	Pack	Price (\$)
def-dA-CE Phosphoramidite	10-1504-02	0.25g	15.00
	10-1504-05	0.5g	30.00
	10-1504-10	1.0g	60.00
dma-dA-CE Phosphoramidite <i>Please inquire.</i>	10-1505		
dmf-dG-CE Phosphoramidite	10-1029-02	0.25g	12.50
	10-1029-05	0.5g	25.00
	10-1029-10	1.0g	50.00
	10-1029-20	2.0g	100.00
	10-1029-40	4.0g	200.00



OTHER INSTRUMENT TYPES

All minor bases, RNA products and modifiers are packaged in septum-capped vials suitable for ABI and other instruments. If you would like another type of vial/column add the following to the end of the catalog number.

Monomers
For Instrument type Add

Expedite E
MerMade M

Columns
For Instrument type Add

Expedite E
Applied Biosystems 3900 A
MerMade M

(Please inquire for availability of vials and columns for other instrument types.)

ULTRAMILD CE PHOSPHoramidites

An alternative protecting scheme for the normal CE phosphoramidites should allow UltraMILD deprotection and should not react with a wider variety of tags and labels. A set of monomers using phenoxyacetyl (Pac) protected dA and 4-isopropylphenoxyacetyl (iPr-Pac) protected dG, along with acetyl protected dC, met the desired criteria for UltraMILD deprotection.

We recommend the use of phenoxyacetic anhydride (Pac₂O) in Cap A. This modification removes the possibility of exchange of the iPr-Pac protecting group on the dG with acetate from the acetic anhydride capping mix. Cleavage and deprotection can be carried out in 2 hours at room temperature with ammonium hydroxide or 4 hours with 0.05M potassium carbonate in methanol.

Item	Catalog No.	Pack	Price (\$)
Pac-dA-CE Phosphoramidite	10-1601-02	0.25g	15.00
	10-1601-05	0.5g	30.00
	10-1601-10	1.0g	60.00
Ac-dC-CE Phosphoramidite	10-1015-02	0.25g	12.50
	10-1015-05	0.5g	25.00
	10-1015-10	1.0g	50.00
iPr-Pac-dG-CE Phosphoramidite	10-1621-02	0.25g	15.00
	10-1621-05	0.5g	30.00
	10-1621-10	1.0g	60.00

ULTRAMILD SUPPORTS

Item	Catalog No.	Catalog No.	Catalog No.	Pack	Price(\$)
	Pac-dA	Ac-dC	iPr-Pac-dG		
UltraMild CPG (Bulk)	20-2601-01	Listed	20-2621-01	0.1g	18.00
	20-2601-02	on	20-2621-02	0.25g	40.00
	20-2601-10	Page 8	20-2621-10	1.0g	150.00
ABI Columns	20-2701-45	20-2115-45	20-2721-45	4X40nm	40.00
	20-2701-42	20-2115-42	20-2721-42	4X0.2µm	40.00
	20-2701-41	20-2115-41	20-2721-41	4X1µm	60.00
	20-2701-13	20-2115-13	20-2721-13	10µm	100.00
	Expedite Columns	20-2801-45	20-2215-45	20-2821-45	4X40nm
20-2801-42		20-2215-42	20-2821-42	4X0.2µm	40.00
20-2801-41		20-2215-41	20-2821-41	4X1µm	60.00
20-2801-14		20-2215-14	20-2821-14	15µm	150.00

ULTRAMILD SOLVENTS/REAGENTS

Item	Catalog No.	Pack	Price (\$)
<i>Cap Mix A</i> THF/Pyridine/Pac ₂ O <i>(Applied Biosystems)</i>	40-4210-52	200mL	140.00
	40-4210-57	450mL	300.00
THF/Pac ₂ O <i>(Expedite)</i>	40-4212-52	200mL	140.00
	40-4212-57	450mL	300.00
<i>Deprotection Solution</i> 0.05M Potassium Carbonate in Methanol	60-4600-30	30mL	30.00

SEE ALSO

Universal Support III on page 24

OTHER INSTRUMENT TYPES

All minor bases, RNA products and modifiers are packaged in septum-capped vials suitable for ABI and other instruments. If you would like another type of vial/column add the following to the end of the catalog number.

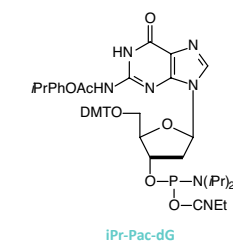
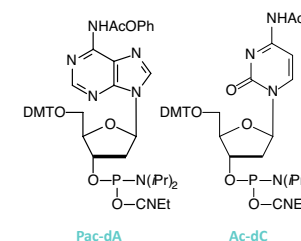
Monomers
For Instrument type Add

Expedite E
MerMade M

Columns
For Instrument type Add

Expedite E
Applied Biosystems 3900 A
MerMade M

(Please inquire for availability of vials and columns for other instrument types.)



GLEN UNYSUPPORT

OTHER INSTRUMENT TYPES

All minor bases, RNA products and modifiers are packaged in septum-capped vials suitable for ABI and other instruments. If you would like another type of vial/column add the following to the end of the catalog number.

Monomers	
<i>For Instrument type</i>	<i>Add</i>
Expedite	E
MerMade	M

Columns	
<i>For Instrument type</i>	<i>Add</i>

Expedite	E
Applied Biosystems 3900	A
MerMade	M

(Please inquire for availability of vials and columns for other instrument types.)

REFERENCES

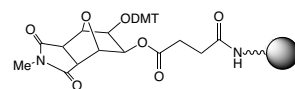
- (1) A.P. Guzaev, and M. Manoharan, *J Am Chem Soc*, 2003, **125**, 2380-2381.
 (2) R.K. Kumar, A.P. Guzaev, C. Rentel, and V.T. Ravikumar, *Tetrahedron*, 2006, **62**, 4528.

ELIMINATION CONDITIONS

Reagent	Conditions
Ammonium hydroxide	80°C/2h 55°C/8h
Ammonium hydroxide/ 40% Methylamine (AMA)	80°C/0.5h 65°C/1h 55°C/8h
Methylamine Gas	65°C/0.5h/30psi
Potassium Carbonate in Methanol	RT/17h
t-Butylamine/Water (1:3 v/v)	60°C/4h

INTELLECTUAL PROPERTY

This product is covered by US Patent 7,202,264 owned by Ionis Pharmaceuticals, Inc..



Glen UnySupport

22

Our original Universal Support (20-5000) has been discontinued since complete dephosphorylation using ammonium hydroxide, AMA or anhydrous methylamine gas takes longer than most companies wish to allocate. A recent development has been the use of a support based on a molecule which is “conformationally preorganized” to accelerate the dephosphorylation reaction.^{1,2} By using a rigid bicyclic molecule on the support, the rate of elimination is markedly faster than the original Universal Support. The structure of Glen UnySupport™ is shown below. The N-phenyl version, developed at Isis Pharmaceuticals as UnyLinker™, is available from several companies for large scale oligo synthesis. Glen UnySupport is the N-methyl version, which is preferred for high throughput oligonucleotide synthesis since methylamine rather than aniline is formed on deprotection. We are happy to offer Glen UnySupport in a variety of popular formats under license from Ionis Pharmaceuticals.

Item	Catalog No.	Pack	Price(\$)
Bulk Supports			
Glen UnySupport	20-5040-01	0.1g	11.00
(500Å CPG)	20-5040-02	0.25g	25.00
	20-5040-10	1.0g	95.00
Glen UnySupport	20-5041-01	0.1g	11.00
(1000Å CPG)	20-5041-02	0.25g	25.00
	20-5041-10	1.0g	95.00
High Load Glen UnySupport	25-5040-01	0.1g	15.00
	25-5040-02	0.25g	30.00
	25-5040-10	1.0g	115.00
Glen UnySupport PS	26-5040-01	0.1g	16.00
	26-5040-02	0.25g	35.00
	26-5040-10	1.0g	125.00
Columns			
The 1000Å columns and frits below are routinely stocked.			
ABI Format (not LV)			
1 µmole columns	20-5141-41	Pack of 4	60.00
0.2 µmole columns	20-5141-42	Pack of 4	40.00
40 nmole columns	20-5141-45	Pack of 4	40.00
10 µmole column (TWIST Format)	20-5141-13	Pack of 1	100.00
40 nmole frits	20-5441-95	Pack of 96	150.00
Female-Female Luer Adapter for 40 nmole frits	20-0060-00	Pack of 10	20.00
AB 3900 Format			
Glen UnySupport PS			
200 nmole columns	26-5140-52	Pack of 10	100.00
40 nmole columns	26-5140-55	Pack of 10	100.00
Expedite Format			
1 µmole columns	20-5241-41	Pack of 4	60.00
0.2 µmole columns	20-5241-42	Pack of 4	40.00
40 nmole columns	20-5241-45	Pack of 4	40.00
15 µmole column (TWIST Format)	20-5241-14	Pack of 1	150.00
96 Well Format (MerMade, etc.)			
1 µmole columns	20-5141-91	Pack of 96	375.00
200 nmole columns	20-5141-92	Pack of 96	250.00
40 nmole columns	20-5141-95	Pack of 96	250.00

GLEN UNYSUPPORT FC

The extended time required to cleave the succinate linkage of the original Glen UnySupport can be problematical, especially in high-throughput production of oligos, due to the outgassing of ammonia and/or methylamine. This reduction in concentration of gas can necessitate the evaporation of the cleavage solution and addition of fresh Ammonium Hydroxide:MethylAmine 1:1 (AMA) or ammonium hydroxide (NH₄OH) to ensure complete deprotection and dephosphorylation of the product oligos. Using a diglycolate linkage in Glen UnySupport FC instead of the succinate in Glen UnySupport, a significant increase in the rate of cleavage has been achieved. The minimum cleavage times for both versions are as follows:

	AMA	NH ₄ OH
Glen UnySupport	10 min.	40 min.
Glen UnySupport FC	2 min.	5 min.

With the cleavage time of Glen UnySupport FC reduced to less than 5 minutes, there is minimal loss of volatile gas and, therefore, no need to evaporate the cleavage solution and replenish with fresh AMA or ammonium hydroxide solutions.

We offer Glen UnySupport FC attached to 1000Å CPG in a variety of formats suited to high throughput synthesis, as well as in bulk for more routine use.

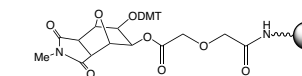
Item	Catalog No.	Pack	Price(\$)
Bulk Support			
Glen UnySupport FC	22-5041-01	0.1g	11.00
(1000Å CPG)	22-5041-02	0.25g	25.00
	22-5041-10	1.0g	95.00
ABI Format (not LV)			
1 µmole columns	22-5141-41	Pack of 4	60.00
0.2 µmole columns	22-5141-42	Pack of 4	40.00
40 nmole columns	22-5141-45	Pack of 4	40.00
10 µmole column (TWIST Format)	22-5141-13	Pack of 1	100.00
AB 3900 Format			
Glen UnySupport CPG			
200 nmole columns	22-5141-52	Pack of 10	100.00
40 nmole columns	22-5141-55	Pack of 10	100.00
Expedite Format			
1 µmole columns	22-5241-41	Pack of 4	60.00
0.2 µmole columns	22-5241-42	Pack of 4	40.00
40 nmole columns	22-5241-45	Pack of 4	40.00
15 µmole column (TWIST Format)	22-5241-14	Pack of 1	150.00
96 Well Format (MerMade, etc.)			
1 µmole columns	22-5141-91	Pack of 96	375.00
200 nmole columns	22-5141-92	Pack of 96	250.00
40 nmole columns	22-5141-95	Pack of 96	250.00

ELIMINATION CONDITIONS

Reagent	Conditions
Ammonium hydroxide	80°C/2h 55°C/8h
Ammonium hydroxide/ 40% Methylamine (AMA)	80°C/0.5h 65°C/1h 55°C/8h
Methylamine Gas	65°C/0.5h/30psi
Potassium Carbonate in Methanol	RT/17h
t-Butylamine/Water (1:3 v/v)	60°C/4h

INTELLECTUAL PROPERTY

This product is covered by US Patent 7,202,264 owned by Ionis Pharmaceuticals, Inc..



Glen UnySupport FC

23

REFERENCES

- (1) A.V. Azhayev, *Tetrahedron*, 1999, **55**, 787-800.
 (2) A.V. Azhayev and M. Antopolsky, *Tetrahedron*, 2001, **57**, 4977-4986.

INTELLECTUAL PROPERTY

This product is covered by US Patent No.: 6,770,754 and European Patent No.: 1404695.

CLEAVAGE AND DEPROTECTION

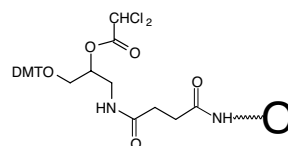
1. Cleavage
 For standard and UltraFast deprotection protocols, cleave the oligo from the support using 2M ammonia in methanol at room temperature for 30 minutes. (Only for oligonucleotides greater than 50 nucleotides in length, rinse the support with a further volume of water. Combine the two washes and evaporate to dryness.)

2. Deprotection Standard
 Add 1 volume of 30% ammonium hydroxide, seal and deprotect using the conditions appropriate for removal of the protecting groups on the nucleobases.

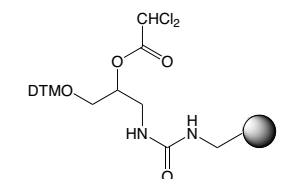
UltraFast
 Add 1 volume of AMA (ammonium hydroxide/40% aqueous methylamine 1:1) seal and deprotect at 65°C for 10 minutes.

UltraMild Using Ammonium Hydroxide
 Add 1 volume of ammonium hydroxide, seal and leave at room temperature for 8 hours.

UltraMild Cleavage and Deprotection Using Potassium Carbonate in Methanol
 Cleave the oligo from the support using 50 mM potassium carbonate in methanol at room temperature for 30 minutes. Seal and leave overnight at room temperature.



Universal Support (1)



Universal Support III (2)

UNIVERSAL SUPPORT III

The key step in the use of any universal support in oligonucleotide synthesis is the dephosphorylation of the 3'-phosphate group to form the desired 3'-hydroxyl group. Azhayev^{1,2} has excelled in the investigation of neighboring group assistance in the dephosphorylation reaction. Amide groups may be considered to be weak N-H acids and can display basic properties in ammonium hydroxide or aqueous methylamine. In the original work^{1,2}, (±)-3-amino-1,2-propanediol was used to form a novel universal support (1). A succinate linker attaches the 3-amino group to the support and the 2-OH is protected with a base-labile group to set up an amide assisted elimination in mildly basic conditions. In this way, the dephosphorylation reaction would eliminate the desired 3'-OH oligonucleotide into solution and the product of any β-elimination competing side reaction would remain bound to the support. A further improvement has been achieved by using a carbamate group to connect the universal linker to the support, as in our product Universal Support III (2). Using Universal Support III, an oligo yield of >80% can be achieved on polymeric supports, with purity equivalent to the same oligo prepared normally.

Conditions for Cleavage and Deprotection are outlined in the table opposite. Universal Support III has been shown to generate oligonucleotides with the same efficacy in polymerase extension reactions as regular oligos. Despite the mild elimination reaction, oligonucleotides up to 75mer in length can be prepared routinely without loss of oligo during the synthesis cycles. This support is also used for the production of siRNA oligos.

Item	Catalog No.	Pack	Price(\$)
Bulk Support			
Universal Support III PS	26-5010-01	0.1g	16.00
	26-5010-02	0.25g	35.00
	26-5010-10	1.0g	125.00
ABI Format (not LV)			
Universal Support III PS			
1 μmole columns	26-5110-41	Pack of 4	60.00
0.2 μmole columns	26-5110-42	Pack of 4	40.00
40 nmole columns	26-5110-45	Pack of 4	40.00
10 μmole column (TWIST Format)	26-5110-13	Pack of 1	100.00
Expedite Format			
1 μmole columns	26-5210-41	Pack of 4	60.00
0.2 μmole columns	26-5210-42	Pack of 4	40.00
40 nmole columns	26-5210-45	Pack of 4	40.00
15 μmole column (TWIST Format)	26-5210-14	Pack of 1	150.00
96 Well Format (MerMade, etc.)			
Universal Support III PS			
1 μmole columns	26-5110-91	Pack of 96	375.00
200 nmole columns	26-5110-92	Pack of 96	250.00
40 nmole columns	26-5110-95	Pack of 96	250.00
AB 3900 Format			
Universal Support III PS			
200 nmole columns	26-5110-52	Pack of 10	100.00
40 nmole columns	26-5110-55	Pack of 10	100.00

Q-SUPPORTS

Oligonucleotides are routinely prepared on supports to which the first nucleoside is attached via a succinate linkage. Over the years, the succinate linkage has demonstrated stability during the synthesis process but has sufficient lability to be cleaved quickly in the deprotection step. However, if the cleavage step is carried out with ammonium hydroxide manually or on the synthesizer, it consumes one hour of precious time while releasing only about 80% of the oligonucleotide. This step is, therefore, a bottleneck in the productivity of many synthesis groups.

Is it possible to find a replacement to the succinate group which offers good stability to the synthesis reagents while offering a much faster cleavage step? The oxalate group has been shown to be very labile during cleavage but its stability to the normal synthesis reagents is not good, requiring changes for successful use. In a practical but elegant study¹ of various bifunctional carboxylic acids, Richard Pon's group identified hydroquinone-O,O'-diacetic acid as the most satisfactory alternative to the succinate group. Nucleosides with this linker arm (Q-linker) are attached to supports with the same ease as the succinyl linker arm.

The cleavage time in ammonium hydroxide at room temperature was found to be 2 minutes, but what about the stability during synthesis? How significant was premature cleavage of oligonucleotide on the synthesizer because of the basic reagents in the capping mixes and oxidizer? Pon showed that the Q-linker is stable to the capping reagents but very slightly labile to the oxidizer (8% cleavage in overnight exposure which would correspond to about 2,000 normal synthesis cycles).

We tested the significance of premature cleavage by preparing sixteen 20mer oligonucleotides on a 0.2 μmole scale, eight with succinate and eight with Q-linkers. The succinate supported oligos were cleaved for 1 hour at room temperature, while those on the Q-support were cleaved for 2 minutes. Both sets were then deprotected normally with ammonium hydroxide. The Q-supports actually gave 5% better yields of product than the succinate supports. Oligo purities were equivalent in both sets.

The Q-linker is absolutely compatible with all hydrolytic cleavage procedures, but especially mild procedures like potassium carbonate in methanol. Pon also showed that it is preferable for RNA supports, improving the cleavage time for 2'-silyl protected nucleoside supports from 2 hours (60-65% cleavage) to 5 minutes (95% cleavage).

We are offering Q-linkers of the four regular nucleosides on 500Å CPG in 0.2 and 1 μmole scales.

OTHER INSTRUMENT TYPES

All minor bases, RNA products and modifiers are packaged in septum-capped vials suitable for ABI and other instruments. If you would like another type of vial/column add the following to the end of the catalog number.

Monomers
For Instrument type [Add](#)

Expedite E
 MerMade M

Columns
For Instrument type [Add](#)

Expedite E
 Applied Biosystems 3900 A
 MerMade M

(Please inquire for availability of vials and columns for other instrument types.)

REFERENCE

- (1) R.T. Pon and S.Y. Yu, *Tetrahedron Lett*, 1997, **38**, 3327-3330.

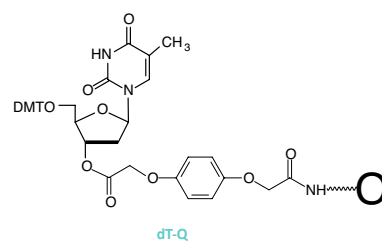
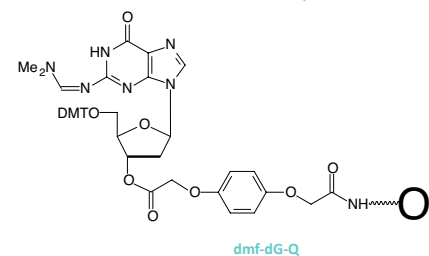
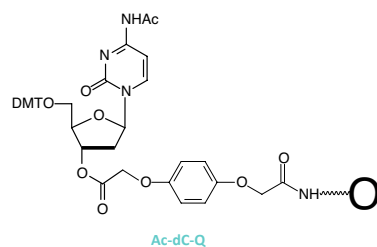
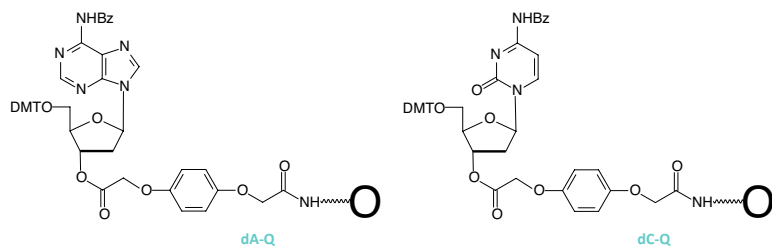
Q/SUCCINATE COMPARISON

Q-Support (2 minutes cleavage)	Succinate (60 minutes cleavage)
132 ODU*	125 ODU*

**Average crude yield from eight 1 μmole columns deprotected normally.*

Q-SUPPORTS (CONT.)

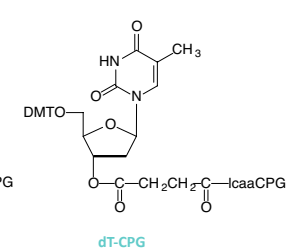
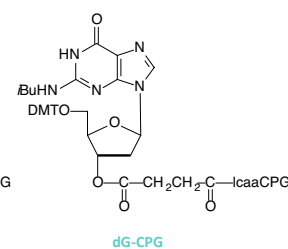
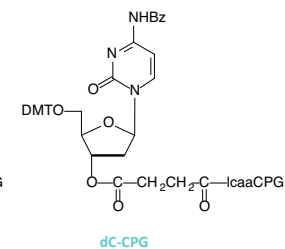
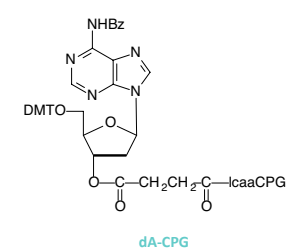
Catalog No.	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Pack	Price(\$)
dA	dC	Ac-dC	dmf-dG	dT		
500Å Bulk Support						
21-2000-01	21-2010-01	21-2013-01	21-2029-01	21-2030-01	0.1g	11.00
21-2000-02	21-2010-02	21-2013-02	21-2029-02	21-2030-02	0.25g	25.00
21-2000-10	21-2010-10	21-2013-10	21-2029-10	21-2030-10	1.0g	95.00
ABI Format (not LV)						
21-2100-41	21-2110-41	21-2113-41	21-2129-41	21-2130-41	4X1μm	60.00
21-2100-42	21-2110-42	21-2113-42	21-2129-42	21-2130-42	4X0.2μm	40.00
Expedite Format						
21-2200-41	21-2210-41	21-2213-41	21-2229-41	21-2230-41	4X1μm	60.00
21-2200-42	21-2210-42	21-2213-42	21-2229-42	21-2230-42	4X0.2μm	40.00



HIGH LOAD CPG

Our high loading support is based on controlled pore silica and it retains the usual 500Å pores. The spacer is also conventional. The only significant difference is the loading which is in the range 80 - 130μmoles/g or about 2.5 times the loading of normal 500Å CPG. Typical loadings for our high load CPG are in the 100 - 120μmoles/g range. As a consequence of the high loading, this support should not be used for sequences longer than 40mers. This high loading support is available in columns for most synthesizers. The 2.5μmole column is identical to our standard 1μmole column (with the exception of the loading). It should be used on occasions when greater than 1μmole is desired but when a 10 or 15μmole synthesis is too high. It should be run using the 1μmole cycle. The 25μmole column is identical to the 10μmole column used on Applied Biosystems synthesizers. It is run using the 10μmole cycle. The 35μmole column is used as an alternative to the 15μmole Expedite column. Again no changes to the standard cycle are recommended. The support is of course available in bulk for use on large-scale synthesizers. A word of caution is in order. When using a column with a higher load than recommended by the instrument manufacturer, there is a much smaller margin for error. All reagents must be fresh and anhydrous diluent and activator must be used. Should you decide to prepare higher-loading columns, ensure that the molar excess of monomer to support nucleoside is at least 5X and preferably 10X.

Item	Catalog No.	Catalog No.	Catalog No.	Catalog No.	Pack	Price(\$)
	dA	dC	dG	dT		
Columns						
(ABI)	25-2100-46	25-2110-46	25-2120-46	25-2130-46	4X2.5μm	75.00
	25-2100-17	25-2110-17	25-2120-17	25-2130-17	1X25μm	125.00
(Expedite)	25-2200-46	25-2210-46	25-2220-46	25-2230-46	4X2.5μm	75.00
	25-2200-18	25-2210-18	25-2220-18	25-2230-18	1X35μm	185.00
Bulk						
	25-2000-02	25-2010-02	25-2020-02	25-2030-02	0.25g	25.00
	25-2000-10	25-2010-10	25-2020-10	25-2030-10	1.0g	90.00



OTHER INSTRUMENT TYPES

All minor bases, RNA products and modifiers are packaged in septum-capped vials suitable for ABI and other instruments. If you would like another type of vial/column add the following to the end of the catalog number.

Monomers	
For Instrument type	Add
Expedite	E
MerMade	M
Columns	
For Instrument type	Add
Expedite	E
Applied Biosystems 3900	A
MerMade	M

(Please inquire for availability of vials and columns for other instrument types.)

SEE ALSO

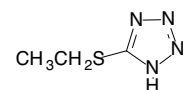
Glen UnySupport on page 22

ALTERNATIVE SOLVENTS/REAGENTS

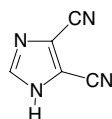
Glen Research offers alternative solvents and reagents in suitable bottles and formulations for use on various DNA synthesizers. All solvents and reagents are prepared to our exacting specifications to ensure the highest coupling efficiencies and are passed through a 0.2 micron filter during packaging to eliminate particulate contamination. Glen Research offers the activators below in powder form for later dissolution in anhydrous acetonitrile or as a prepared solution.

ABBREVIATIONS

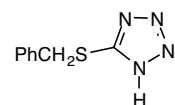
Ac₂O = Acetic Anhydride
 DCA = Dichloroacetic Acid
 DCM = Dichloromethane
 DMAP = Dimethylaminopyridine
 I₂ = Iodine
 Melm = 1-Methylimidazole
 TCA = Trichloroacetic Acid
 THF = Tetrahydrofuran



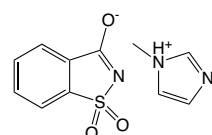
5-Ethylthio-1H-tetrazole



DCI



5-Benzylthio-1H-tetrazole



Saccharin 1-Methylimidazole

INTELLECTUAL PROPERTY

SMI is sold under license from Avecia Biotechnology Inc.

Item	Catalog No.	Pack	Price (\$)
Activator			
5-Ethylthio-1H-tetrazole (ETT)	30-3040-10	1g	35.00
<i>(Dissolve 1g in 31mL anhydrous acetonitrile for a 0.25M solution)</i>	30-3040-20	2g	60.00
	30-3040-25	25g	500.00
0.25M 5-Ethylthio-1H-tetrazole in Acetonitrile <i>(Applied Biosystems)</i>	30-3140-45	45mL	40.00
	30-3140-52	200mL	100.00
	30-3140-57	450mL	200.00
	30-3140-62	2L	760.00
<i>(Expedite)</i>	30-3142-52	200mL	100.00
	30-3140-57	450mL	200.00
4,5-Dicyanoimidazole (DCI), crystalline <i>(Dissolve 1g in 34mL anhydrous acetonitrile for a 0.25M solution)</i>	30-3050-10	1g	35.00
	30-3050-25	25g	500.00
0.25M DCI in Acetonitrile <i>(Applied Biosystems)</i>	30-3150-45	45mL	40.00
	30-3150-52	200mL	100.00
	30-3150-57	450mL	200.00
	30-3150-62	2L	760.00
	30-3152-52	200mL	100.00
	30-3150-57	450mL	200.00
<i>(Expedite)</i>			
5-Benzylthio-1H-tetrazole (BTT) <i>(Dissolve 1g in 21.3mL anhydrous acetonitrile for a 0.25M solution)</i>	30-3070-10	1g	35.00
	30-3070-20	2g	60.00
	30-3070-25	25g	500.00
0.25M 5-Benzylthio-1H-tetrazole in Acetonitrile <i>(Applied Biosystems)</i>	30-3170-45	45mL	40.00
	30-3170-52	200mL	100.00
	30-3170-57	450mL	200.00
	30-3170-62	2L	760.00
<i>(Expedite)</i>	30-3172-52	200mL	100.00
	30-3170-57	450mL	200.00
Saccharin 1-Methylimidazole (SMI) <i>(Dissolve 1g in 31mL anhydrous acetonitrile for a 0.2M solution)</i>	30-3080-10	1g	35.00
	30-3080-20	2g	60.00
	30-3080-25	25g	500.00
0.2M Saccharin 1-Methylimidazole (SMI) in Acetonitrile <i>(Applied Biosystems)</i>	30-3180-45	45mL	40.00
	30-3180-52	200mL	100.00
	30-3180-57	450mL	200.00
	30-3180-62	2L	760.00
<i>(Expedite)</i>	30-3182-52	200mL	100.00
	30-3180-57	450mL	200.00

ALTERNATIVE SOLVENTS/REAGENTS (CONT.)

Item	Catalog No.	Pack	Price (\$)
Cap Mix A			
THF/Lutidine/Ac ₂ O	40-4010-52	200mL	30.00
	40-4010-57	450mL	72.00
	40-4010-62	2L	325.00
THF/Ac ₂ O (9:1)	40-4012-62	2L	275.00
Cap Mix B			
6.5% DMAP in THF <i>(Cap B solutions containing DMAP are preferred by some researchers for preparing long oligos.)</i>	40-4020-52	200mL	42.00
10% Melm in THF	40-4120-52	200mL	30.00
	40-4120-57	450mL	72.00
	40-4120-62	2L	325.00
10% Melm in THF/Pyridine (8:1)	40-4122-62	2L	325.00
Oxidizing Solution			
0.02M I ₂ in THF/Pyridine/H ₂ O	40-4132-62	2L	325.00
Deblocking Mix			
3% DCA/DCM <i>(DCA solutions are more mildly acidic than the TCA equivalents, possibly causing less depurination of dA sites.)</i>	40-4040-57	450mL	36.00
	40-4040-62	2L	144.00
2.5% DCA/DCM	40-4042-57	450mL	36.00
	40-4042-62	2L	144.00

CSO FOR NON-AQUEOUS OXIDATION

Iodine-based oxidizers have been the standard for DNA and RNA synthesis since the advent of automated synthesizers. They are fast and efficient oxidizers, typically requiring less than 30 seconds for complete oxidation of phosphite triesters to phosphate triesters. However, while iodine-based oxidizers work well for most applications, there are some circumstances where non-aqueous oxidizers may be advantageous, especially where the bases or linkages being produced are sensitive to the presence of water and/or iodine during synthesis.

The use of (1S)-(+)-(10-camphorsulfonyl)-oxaziridine (CSO) has been investigated as a non-aqueous oxidizer in DNA synthesis. For example, we found that a 0.5M solution of CSO in acetonitrile worked well as an oxidizer for the synthesis of oligos containing multiple incorporations of 7-deaza-dG, compared with iodine oxidation which caused substantial degradation. CSO has also worked well in the synthesis of a long poly-dI oligo, which could not be prepared using iodine oxidation due to the sensitivity of the base.

CSO has been used for synthesizing oligos that incorporate the phosphonoacetate modification. A solution of 0.1M CSO is recommended for the oxidation of PACE modifications as the phosphonite internucleotide linkage is more easily oxidized than the phosphite internucleotide linkage. When synthesizing DNA-phosphonoacetate chimeric oligos, a 0.5M CSO solution is recommended.

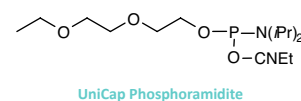
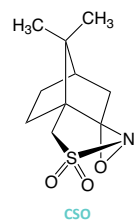
Item	Catalog No.	Pack	Price (\$)
0.5M CSO in Anhydrous Acetonitrile (ABI)	40-4632-52	200mL	250.00
0.5M CSO in Anhydrous Acetonitrile (Expedite)	40-4632-52E	200mL	250.00

(A minimum oxidation time of 3 minutes is required on small scales.)

UNICAP PHOSPHORAMIDITE

The phosphoramidite of diethylene glycol monoethyl ether, UniCap, is the basis for an alternative capping reagent. To use UniCap as a capping amidite on the Expedite 8909 or AB synthesizers, dilute it to the standard amidite concentration and place the vial in position 5 on the instrument. Cycles can be modified by adding coupling steps for amidite reservoir 5 after the last column coupling step. The standard capping steps can be left out of the cycle. UniCap Phosphoramidite was originally developed for oligo synthesis on the surface of chips and is the capping reagent of choice for this application.

Item	Catalog No.	Pack	Price (\$)
UniCap Phosphoramidite	10-4410-02	0.25g	50.00
	10-4410-05	0.5g	100.00
	10-4410-10	1.0g	200.00
	10-4410-20	2.0g	400.00



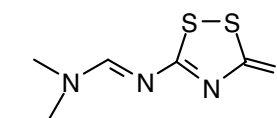
SULFURIZING REAGENTS

Glen Research's Sulfurizing Reagents are used to prepare phosphorothioate linkages using CE phosphoramidite chemistry. Each reagent exhibits the following attributes:

- 1) Reliably soluble, making them safe to use on automated synthesizers.
- 2) Reaction is fast (30 seconds), making the process convenient on small scales and readily amenable to scale-up.
- 3) Process is efficient, with better than 96% of the linkages being phosphorothioate and the remainder being phosphodiester.

Sulfurizing Reagent II (3-((Dimethylamino-methylidene)amino)-3H-1,2,4-dithiazole-3-thione, DDTT) exhibits all the properties of Beaucage Reagent while adding stability in solution on the synthesizer AND offering strong ability to sulfurize RNA linkages. Sulfurizing Reagent II is available in powder form and as a stable solution.

Item	Catalog No.	Pack	Price (\$)
Sulfurizing Reagent II (DDTT)	40-4037-10	1g	50.00
	40-4037-20	2g	100.00
0.05M Sulfurizing Reagent II in pyridine/acetonitrile	40-4137-51	100mL	100.00
	40-4137-52	200mL	200.00
	40-4137-57	450mL	450.00



Sulfurizing Reagent II

SEE ALSO

0.1M CSO in PACE Chemistry on page 37

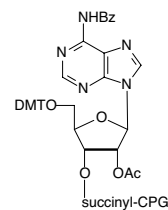
INTELLECTUAL PROPERTY

This capping reagent is supplied under license.

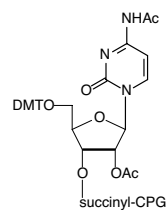
RNA SUPPORTS FOR 3' MODIFICATION

Gen Research offers RNA supports in which protected ribonucleosides are attached to CPG. With 5'-DMT protection, and all other protecting groups base-labile, the use of these supports is identical to DNA supports. These supports are suitable for use in producing oligodeoxynucleotides modified at the 3'-terminus or oligoribonucleotides. ABI-style columns are supplied unless otherwise requested (see note box).

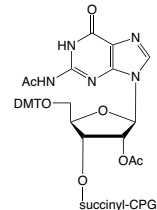
Item	Catalog No.	Pack	Price (\$)	
Bz-A-RNA-CPG	20-3303-01	0.1g	40.00	
	20-3303-02	0.25g	95.00	
	20-3303-10	1.0g	355.00	
	1 μmole columns	20-3403-41	Pack of 4	100.00
	0.2 μmole columns	20-3403-42	Pack of 4	75.00
10 μmole columns (ABI)	20-3403-13	Pack of 1	225.00	
15 μmole column (Expedite)	20-3403-14	Pack of 1	300.00	
Ac-C-RNA-CPG	20-3315-01	0.1g	40.00	
	20-3315-02	0.25g	95.00	
	20-3315-10	1.0g	355.00	
	1 μmole columns	20-3415-41	Pack of 4	100.00
	0.2 μmole columns	20-3415-42	Pack of 4	75.00
10 μmole column (ABI)	20-3415-13	Pack of 1	225.00	
15 μmole column (Expedite)	20-3415-14	Pack of 1	300.00	
Ac-G-RNA-CPG	20-3324-01	0.1g	40.00	
	20-3324-02	0.25g	95.00	
	20-3324-10	1.0g	355.00	
	1 μmole columns	20-3424-41	Pack of 4	100.00
	0.2 μmole columns	20-3424-42	Pack of 4	75.00
10 μmole column (ABI)	20-3424-13	Pack of 1	225.00	
15 μmole column (Expedite)	20-3424-14	Pack of 1	300.00	
U-RNA-CPG	20-3330-01	0.1g	40.00	
	20-3330-02	0.25g	95.00	
	20-3330-10	1.0g	355.00	
	1 μmole columns	20-3430-41	Pack of 4	100.00
	0.2 μmole columns	20-3430-42	Pack of 4	75.00
10 μmole column (ABI)	20-3430-13	Pack of 1	225.00	
15 μmole column (Expedite)	20-3430-14	Pack of 1	300.00	



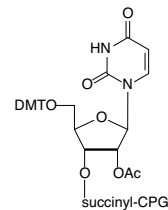
Bz-A-CPG



Ac-C-CPG



Ac-G-CPG

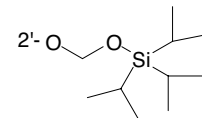


U-CPG

ABBREVIATIONS

Ac = Acetyl
Bz = Benzoyl
CNEt = Cyanoethyl
CPG = Controlled Pore Glass
DMT = 4,4'-Dimethoxytrityl

INTELLECTUAL PROPERTY



TOM-Protecting-Group™

TOM-RNA Phosphoramidites are supplied under agreement with QIAGEN. RNA synthesis using the TOM-Protecting-Group is covered by US Patent No. 5,986,084.

TOM-Protecting-Group is a trademark of QIAGEN.

OTHER INSTRUMENT TYPES

All minor bases, RNA products and modifiers are packaged in septum-capped vials suitable for ABI and other instruments. If you would like another type of vial/column add the following to the end of the catalog number.

Monomers	
For Instrument type	Add
Expedite	E
MerMade	M

Columns	
For Instrument type	Add
Expedite	E
Applied Biosystems 3900	A
MerMade	M

(Please inquire for availability of vials and columns for other instrument types.)

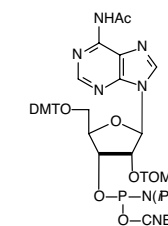
TOM-PROTECTED RNA PHOSPHoramidites

RNA synthesis using monomers containing the 2'-O-TriisopropylsilyloxyMethyl (TOM) group (TOM-Protecting-Group™) is characterized by very high coupling efficiency along with fast, simple deprotection. High coupling efficiency is achieved because the TOM-Protecting-Group exhibits lower steric hindrance than the 2'-O-t-butylidimethylsilyl (TBDMS) group used in our alternative RNA monomers. Fast and reliable deprotection is achieved using methylamine in ethanol/water at room temperature. A further feature of the TOM-Protecting-Group is that during basic steps it can not undergo 2' to 3' migration. This migration under basic conditions leads to non-biologically active 2'-5' linkages when using the TBDMS group. These features allow the TOM-Protected monomers to produce longer oligonucleotides. TOM-Protected RNA monomers are also fully compatible with minor bases with 2'-O-TBDMS protection.

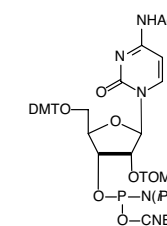
Item	Catalog No.	Pack	Price (\$)
A-TOM-CE Phosphoramidite	10-3004-02	0.25g	75.00
	10-3004-05	0.5g	150.00
	10-3004-10	1.0g	275.00
C-TOM-CE Phosphoramidite	10-3014-02	0.25g	75.00
	10-3014-05	0.5g	150.00
	10-3014-10	1.0g	275.00
G-TOM-CE Phosphoramidite	10-3024-02	0.25g	75.00
	10-3024-05	0.5g	150.00
	10-3024-10	1.0g	275.00
U-TOM-CE Phosphoramidite	10-3034-02	0.25g	75.00
	10-3034-05	0.5g	150.00
	10-3034-10	1.0g	275.00

RNA SUPPORTS FOR TOM RNA SYNTHESIS

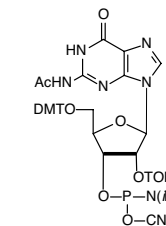
Item	Catalog No.	Pack	Price (\$)	
Ac-A-RNA-CPG	20-3304-01	0.1g	40.00	
	20-3304-02	0.25g	95.00	
	20-3304-10	1.0g	355.00	
	1 μmole columns	20-3404-41	Pack of 4	100.00
	0.2 μmole columns	20-3404-42	Pack of 4	75.00
10 μmole column (ABI)	20-3404-13	Pack of 1	225.00	
15 μmole column (Expedite)	20-3404-14	Pack of 1	300.00	



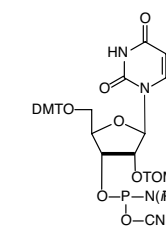
A-TOM



C-TOM



G-TOM



U-TOM

RNA SUPPORTS FOR TOM RNA SYNTHESIS (CONT.)

Item	Catalog No.	Pack	Price (\$)	
Ac-C-RNA-CPG	20-3315-01	0.1g	40.00	
	20-3315-02	0.25g	95.00	
	20-3315-10	1.0g	355.00	
	1 μ mole columns	20-3415-41	Pack of 4	100.00
	0.2 μ mole columns	20-3415-42	Pack of 4	75.00
	10 μ mole column (ABI)	20-3415-13	Pack of 1	225.00
15 μ mole column (Expedite)	20-3415-14	Pack of 1	300.00	
Ac-G-RNA-CPG	20-3324-01	0.1g	40.00	
	20-3324-02	0.25g	95.00	
	20-3324-10	1.0g	355.00	
	1 μ mole columns	20-3424-41	Pack of 4	100.00
	0.2 μ mole columns	20-3424-42	Pack of 4	75.00
	10 μ mole column (ABI)	20-3424-13	Pack of 1	225.00
15 μ mole column (Expedite)	20-3424-14	Pack of 1	300.00	
U-RNA-CPG	20-3330-01	0.1g	40.00	
	20-3330-02	0.25g	95.00	
	20-3330-10	1.0g	355.00	
	1 μ mole columns	20-3430-41	Pack of 4	100.00
	0.2 μ mole columns	20-3430-42	Pack of 4	75.00
	10 μ mole column (ABI)	20-3430-13	Pack of 1	225.00
15 μ mole column (Expedite)	20-3430-14	Pack of 1	300.00	

ABBREVIATIONS

Bz = Benzoyl
 CNET = Cyanoethyl
 CPG = Controlled Pore Glass
 dmf = Dimethylformamide
 DMT = 4,4'-Dimethoxytrityl
 iPr = Isopropyl
 lcaa = long chain alkylamino
 Pac = Phenoxyacetyl
 PhOAc = Phenoxyacetyl
 TBDMS = t-Butyl-dimethylsilyl

INSTRUMENT TYPES

Glen Research packages these monomers in a variety of industry-standard vials and bottles. Please provide the exact specification of the bottle required prior to receiving a quotation.

TBDMS-PROTECTED RNA PHOSPHORAMIDITES

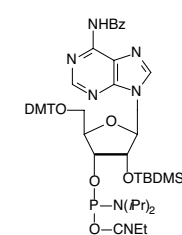
Glen Research CE (β -cyanoethyl) Phosphoramidites for RNA synthesis are produced and packaged to ensure the highest performance on commercial synthesizers. Every batch is accompanied by a Certificate of Analysis and an HPLC trace, showing the results of our QC testing. RNA Phosphoramidites are synthesis-tested with a minimum coupling efficiency of 97%. Glen Research RNA monomers are packaged in industry standard vials which are specially cleaned to eliminate particulate contamination. These monomers are available in a variety of packs, including high throughput (HT) and low cost (LC). An UltraMild set is also available for situations where sensitive bases are in use. Dmf-G (10-3029) has been discontinued and may be substituted with Ac-G (10-3025).

Item	Catalog No.	Pack	Price (\$)
Bz-A-CE Phosphoramidite	10-3003-02	0.25g	40.00
	10-3003-05	0.5g	80.00
	10-3003-10	1.0g	160.00
Ac-C-CE Phosphoramidite	10-3015-02	0.25g	40.00
	10-3015-05	0.5g	80.00
	10-3015-10	1.0g	160.00
Ac-G-CE Phosphoramidite	10-3025-02	0.25g	40.00
	10-3025-05	0.5g	80.00
	10-3025-10	1.0g	160.00
U-CE Phosphoramidite	10-3030-02	0.25g	40.00
	10-3030-05	0.5g	80.00
	10-3030-10	1.0g	160.00

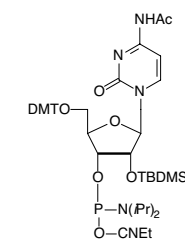
RNA PHOSPHORAMIDITES - SPECIAL PACKAGING

We offer our high quality DNA phosphoramidites specifically packaged for high throughput and large-scale synthesis customers. These customers normally require high quality materials produced under the guidelines of a validated quality management system while still being priced aggressively. These products include the usual Glen Research certification and guarantees and they are available in larger packs or in bulk. The core catalog numbers for regular DNA phosphoramidites are shown below. For these products, please request a quote.

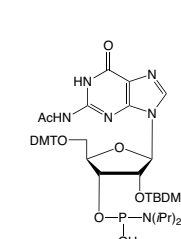
Item	Catalog No.	Pack	Price (\$)
Bz-A-CE Phosphoramidite	10-3003-SP		
Ac-C-CE Phosphoramidite	10-3015-SP		
Ac-G-CE Phosphoramidite	10-3025-SP		
U-CE Phosphoramidite	10-3030-SP		



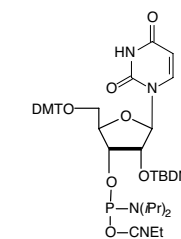
Bz-A-CE Phosphoramidite



Ac-C-CE Phosphoramidite



Ac-G-CE Phosphoramidite



U-CE Phosphoramidite

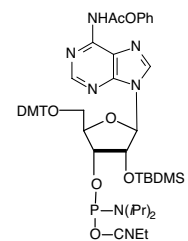
ULTRAMILD TBDMS RNA PHOSPHoramidites

Item	Catalog No.	Pack	Price (\$)
Pac-A-CE Phosphoramidite	10-3000-02	0.25g	75.00
	10-3000-05	0.5g	150.00
	10-3000-10	1.0g	275.00
Ac-C-CE Phosphoramidite	10-3015-02	0.25g	40.00
	10-3015-05	0.5g	80.00
	10-3015-10	1.0g	160.00
iPr-Pac-G-CE Phosphoramidite	10-3021-02	0.25g	75.00
	10-3021-05	0.5g	150.00
	10-3021-10	1.0g	275.00
U-CE Phosphoramidite	10-3030-02	0.25g	40.00
	10-3030-05	0.5g	80.00
	10-3030-10	1.0g	160.00

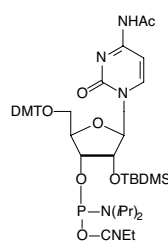
TBDMS RNA SUPPORTS

ABI-style columns are supplied for 1 μ mole and 0.2 μ mole scales unless otherwise requested (see note box).

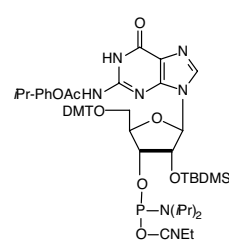
Item	Catalog No.	Pack	Price (\$)	
Pac-A-RNA-CPG	20-3300-01	0.1g	40.00	
	20-3300-02	0.25g	95.00	
	20-3300-10	1.0g	355.00	
	20-3400-41	Pack of 4	100.00	
	20-3400-42	Pack of 4	75.00	
1 μ mole columns	20-3400-13	Pack of 1	225.00	
0.2 μ mole columns	20-3400-14	Pack of 1	300.00	
10 μ mole column (ABI)				
15 μ mole column (Expedite)				
Bz-A-RNA-CPG	20-3303-01	0.1g	40.00	
	20-3303-02	0.25g	95.00	
	20-3303-10	1.0g	355.00	
	20-3403-41	Pack of 4	100.00	
	20-3403-42	Pack of 4	75.00	
	20-3403-13	Pack of 1	225.00	
	20-3403-14	Pack of 1	300.00	
	1 μ mole columns			
	0.2 μ mole columns			
	10 μ mole column (ABI)			
15 μ mole column (Expedite)				



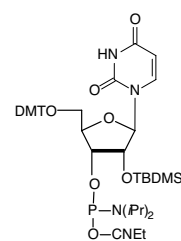
Pac-A-CE Phosphoramidite



Ac-C-CE Phosphoramidite



iPr-Pac-G-CE Phosphoramidite



U-CE Phosphoramidite

OTHER INSTRUMENT TYPES

All minor bases, RNA products and modifiers are packaged in septum-capped vials suitable for ABI and other instruments. If you would like another type of vial/column add the following to the end of the catalog number.

Monomers
For Instrument type Add

Expedite E
MerMade M

Columns
For Instrument type Add

Expedite E
Applied Biosystems 3900 A
MerMade M

(Please inquire for availability of vials and columns for other instrument types.)

OTHER INSTRUMENT TYPES

All minor bases, RNA products and modifiers are packaged in septum-capped vials suitable for ABI and other instruments. If you would like another type of vial/column add the following to the end of the catalog number.

Monomers
For Instrument type Add

Expedite E
MerMade M

Columns
For Instrument type Add

Expedite E
Applied Biosystems 3900 A
MerMade M

(Please inquire for availability of vials and columns for other instrument types.)

TBDMS RNA SUPPORTS (CONT.)

Item	Catalog No.	Pack	Price (\$)	
Ac-C-RNA-CPG	20-3315-01	0.1g	40.00	
	20-3315-02	0.25g	95.00	
	20-3315-10	1.0g	355.00	
	20-3415-41	Pack of 4	100.00	
	20-3415-42	Pack of 4	75.00	
1 μ mole columns	20-3415-13	Pack of 1	225.00	
0.2 μ mole columns	20-3415-14	Pack of 1	300.00	
10 μ mole column (ABI)				
15 μ mole column (Expedite)				
iPr-Pac-G-RNA-CPG	20-3321-01	0.1g	40.00	
	20-3321-02	0.25g	95.00	
	20-3321-10	1.0g	355.00	
	20-3421-41	Pack of 4	100.00	
	20-3421-42	Pack of 4	75.00	
	20-3421-13	Pack of 1	225.00	
	20-3421-14	Pack of 1	300.00	
1 μ mole columns				
0.2 μ mole columns				
10 μ mole column (ABI)				
15 μ mole column (Expedite)				
Ac-G-RNA-CPG	20-3324-01	0.1g	40.00	
	20-3324-02	0.25g	95.00	
	20-3324-10	1.0g	355.00	
	20-3424-41	Pack of 4	100.00	
	20-3424-42	Pack of 4	75.00	
	20-3424-13	Pack of 1	225.00	
	20-3424-14	Pack of 1	300.00	
	1 μ mole columns			
	0.2 μ mole columns			
	10 μ mole column (ABI)			
15 μ mole column (Expedite)				
U-RNA-CPG	20-3330-01	0.1g	40.00	
	20-3330-02	0.25g	95.00	
	20-3330-10	1.0g	355.00	
	20-3430-41	Pack of 4	100.00	
	20-3430-42	Pack of 4	75.00	
20-3430-13	Pack of 1	225.00		
20-3430-14	Pack of 1	300.00		
1 μ mole columns				
0.2 μ mole columns				
10 μ mole column (ABI)				
15 μ mole column (Expedite)				

ULTRAMILD SOLVENTS/REAGENTS

Item	Catalog No.	Pack	Price (\$)
<i>Cap Mix A</i> THF/Pyridine/Pac ₂ O (Applied Biosystems)	40-4210-52	200mL	140.00
	40-4210-57	450mL	300.00
THF/Pac ₂ O (Expedite)	40-4212-52	200mL	140.00
	40-4212-57	450mL	300.00
<i>Deprotection Solution</i> 0.05M Potassium Carbonate in Methanol	60-4600-30	30mL	30.00

2'-OME-RNA PHOSPHoramidites

Glen Research 2'-Ome-RNA CE (β -cyanoethyl) Phosphoramidites are designed to produce synthetic oligonucleotides containing nuclease resistant 2'-O-methyl ribonucleotide linkages. Deprotection, isolation and handling of 2'-O-methyl oligonucleotides are identical to the procedures for oligodeoxynucleotides.

Item	Catalog No.	Pack	Price(\$)
2'-Ome-A-CE Phosphoramidite	10-3100-90	100 μ mole	20.00
	10-3100-02	0.25g	50.00
	10-3100-05	0.5g	100.00
	10-3100-10	1.0g	200.00
2'-Ome-C-CE Phosphoramidite	10-3110-90	100 μ mole	20.00
	10-3110-02	0.25g	50.00
	10-3110-05	0.5g	100.00
	10-3110-10	1.0g	200.00
2'-Ome-Ac-C-CE Phosphoramidite	10-3115-90	100 μ mole	20.00
	10-3115-02	0.25g	50.00
	10-3115-05	0.5g	100.00
	10-3115-10	1.0g	200.00
2'-Ome-iBu-G-CE Phosphoramidite	10-3120-90	100 μ mole	20.00
	10-3120-02	0.25g	50.00
	10-3120-05	0.5g	100.00
	10-3120-10	1.0g	200.00
2'-Ome-G-CE Phosphoramidite	10-3121-90	100 μ mole	20.00
	10-3121-02	0.25g	50.00
	10-3121-05	0.5g	100.00
	10-3121-10	1.0g	200.00
2'-Ome-U-CE Phosphoramidite	10-3130-90	100 μ mole	20.00
	10-3130-02	0.25g	50.00
	10-3130-05	0.5g	100.00
	10-3130-10	1.0g	200.00

OTHER INSTRUMENT TYPES

All minor bases, RNA products and modifiers are packaged in septum-capped vials suitable for ABI and other instruments. If you would like another type of vial/column add the following to the end of the catalog number.

Monomers
For Instrument type Add

Expedite E
MerMade M

Columns
For Instrument type Add

Expedite E
Applied Biosystems 3900 A
MerMade M

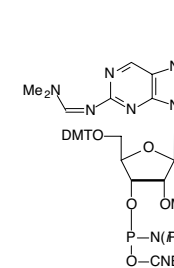
(Please inquire for availability of vials and columns for other instrument types.)

ULTRAMILD 2'-OME-RNA

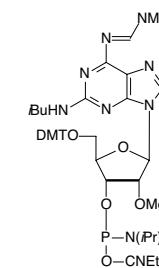
The use of UltraMild monomers in oligonucleotide synthesis has allowed very sensitive dyes like TAMRA, HEX and Cy5 to be used virtually routinely. The DNA and RNA monomers are currently available and we also provide this set of 2'-Ome-RNA monomers. In our version of this chemistry, we use as protecting groups phenoxyacetyl (Pac) for A, acetyl (Ac) for C, and isopropyl-phenoxyacetyl (iPr-Pac) for G.

It has become clear that acetic anhydride in the conventional capping mix can cause transamidation in situations where an amine protecting group is quite labile. This leads to acetyl protection on the amino group that may be slow to be removed. Consequently, if many dG residues are included in the oligonucleotide, we recommend the use of phenoxyacetic anhydride (Pac₂O) in Cap A. This modification removes the possibility of exchange of the iPr-Pac protecting group on the dG with acetate from the acetic anhydride capping mix.

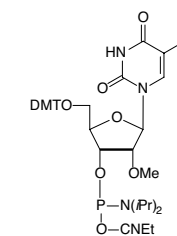
Item	Catalog No.	Pack	Price (\$)
2'-Ome-Pac-A-CE Phosphoramidite	10-3601-02	0.25g	62.50
	10-3601-05	0.5g	125.00
	10-3601-10	1.0g	250.00
2'-Ome-Ac-C-CE Phosphoramidite	10-3115-02	0.25g	50.00
	10-3115-05	0.5g	100.00
	10-3115-10	1.0g	200.00
2'-Ome-iPr-Pac-G-CE Phosphoramidite	10-3621-02	0.25g	62.50
	10-3621-05	0.5g	125.00
	10-3621-10	1.0g	250.00



2'-Ome-2-AP



2'-Ome-2-amino-A



2'-Ome-5-Me-U

ULTRAMILD SOLVENTS/REAGENTS

Cap Mix A THF/Pyridine/Pac ₂ O (Applied Biosystems)	40-4210-52	200mL	140.00
	40-4210-57	450mL	300.00
THF/Pac ₂ O (Expedite)	40-4212-52	200mL	140.00
	40-4212-57	450mL	300.00
Deprotection Solution 0.05M Potassium Carbonate in Methanol	60-4600-30	30mL	30.00

OTHER INSTRUMENT TYPES

All minor bases, RNA products and modifiers are packaged in septum-capped vials suitable for ABI and other instruments. If you would like another type of vial/column add the following to the end of the catalog number.

Monomers
For Instrument type Add

Expedite E
MerMade M

Columns
For Instrument type Add

Expedite E
Applied Biosystems 3900 A
MerMade M

(Please inquire for availability of vials and columns for other instrument types.)

SEE ALSO

DNA Thiophosphoramidites on page 40

OTHER INSTRUMENT TYPES

All minor bases, RNA products and modifiers are packaged in septum-capped vials suitable for ABI and other instruments. If you would like another type of vial/column add the following to the end of the catalog number.

Monomers
For Instrument type Add

Expedite E
MerMade M

Columns
For Instrument type Add

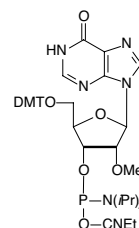
Expedite E
Applied Biosystems 3900 A
MerMade M

(Please inquire for availability of vials and columns for other instrument types.)

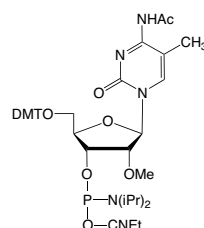
2'-OME-RNA SUPPORTS

ABI-style columns are supplied for 1 μmole and 0.2 μmole scales unless otherwise requested (see note box).

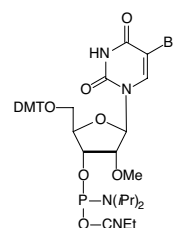
Item	Catalog No.	Pack	Price (\$)
2'-OMe-A-RNA-CPG	20-3600-01	0.1g	40.00
	20-3600-02	0.25g	95.00
	20-3600-10	1.0g	355.00
	20-3700-41	Pack of 4	100.00
	20-3700-42	Pack of 4	75.00
1 μmole columns	20-3700-13	Pack of 1	225.00
	20-3700-14	Pack of 1	300.00
	20-3700-14	Pack of 1	300.00
2'-OMe-C-RNA-CPG	20-3610-01	0.1g	40.00
	20-3610-02	0.25g	95.00
	20-3610-10	1.0g	355.00
	20-3710-41	Pack of 4	100.00
	20-3710-42	Pack of 4	75.00
10 μmole column (ABI)	20-3710-13	Pack of 1	225.00
	20-3710-14	Pack of 1	300.00
	20-3710-14	Pack of 1	300.00
2'-OMe-Ac-C-RNA-CPG	20-3615-01	0.1g	40.00
	20-3615-02	0.25g	95.00
	20-3615-10	1.0g	355.00
	20-3715-41	Pack of 4	100.00
	20-3715-42	Pack of 4	75.00
10 μmole column (ABI)	20-3715-13	Pack of 1	225.00
	20-3715-14	Pack of 1	300.00
	20-3715-14	Pack of 1	300.00



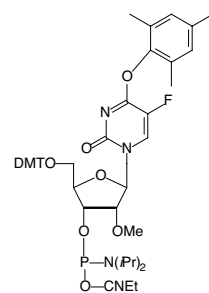
2'-OMe-I



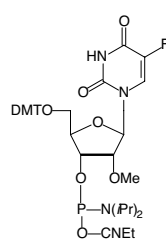
2'-OMe-5-Me-C



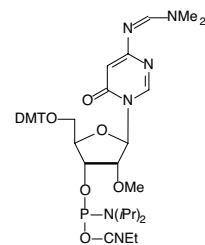
2'-OMe-5-Br-U



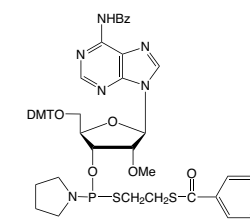
2'-OMe-TMP-5-F-U



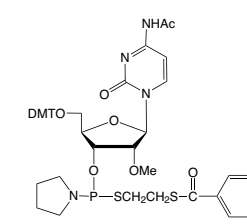
2'-OMe-5-F-U



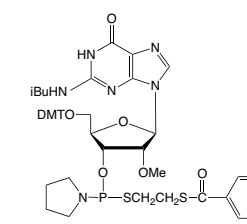
2'-OMe-3-deaza-5-aza-C



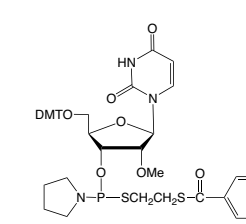
2'-OMe-A-Thiophosphoramidite



2'-OMe-C-Thiophosphoramidite



2'-OMe-G-Thiophosphoramidite



2'-OMe-U-Thiophosphoramidite

Index

A

A

2'-OMe-A-CE Phosphoramidite 38
 2'-OMe-A-RNA 41
 2'-OMe-Pac-A-CE Phosphoramidite 39
 Ac-A-RNA-CPG 33
 A-TOM-CE Phosphoramidite 33
 Bz-A-CE Phosphoramidite 35
 Bz-A-RNA-CPG 32, 36
 dA-CE Phosphoramidite 6, 10, 13, 14, 16, 18
 def-dA-CE Phosphoramidite 20
 dma-dA-CE Phosphoramidite 20
 Pac-A-CE Phosphoramidite 36
 Pac-A-RNA-CPG 36
 Pac-dA-CE Phosphoramidite 21

Activator (Powder)

4,5-Dicyanoimidazole 28
 5-Benzylthio-1H-tetrazole 28
 5-Ethylthio-1H-tetrazole 24, 28
 Saccharin 1-Methylimidazole 28

ÄKTA oligopilot 16, 17

Alternative Solvents and Reagents 28

Applied Biosystems Instruments

AB 3900 1000Å CPG Columns 8
 AB 3900 Polystyrene Columns 8
 AB 3900 Polystyrene Modifier Columns 9
 CE Phosphoramidites 6
 Solvents/Reagents 6
 Supports and Columns 7

B

Benzylthio-1H-tetrazole 28

C

C

2'-OMe-Ac-C-CE Phosphoramidite 38, 39
 2'-OMe-Ac-C-RNA 41
 2'-OMe-C-CE Phosphoramidite 38
 2'-OMe-C-RNA 41
 Ac-C-CE Phosphoramidite 35
 Ac-C-RNA-CPG 32, 34, 37
 Ac-dC-CE Phosphoramidite 6, 10, 13, 14, 16, 18, 21
 C-TOM-CE Phosphoramidite 33
 dC-CE Phosphoramidite 6, 10, 13, 14, 16, 18

Camphorsulfonyloxaziridine (CSO) 30

Capping Reagent

UniCap Phosphoramidite 30

Cross-linking 20

D

DCI (4,5-Dicyanoimidazole) 28

Depurination Resistant CE Phosphoramidites 20

Dicyanoimidazole 28

Distributors 4

Dr. Oligo Synthesizers

CE Phosphoramidites 18
 Solvents and Reagents 18
 Supports and Columns 19

E

Ethylthiotetrazole 28

Expedite™ Instruments

CE Phosphoramidites 10
 Solvents and Reagents 10
 Supports and Columns 11

G

G

2'-OMe-G-CE Phosphoramidite 38
 2'-OMe-iPr-Pac-G-CE Phosphoramidite 39
 Ac-G-CE Phosphoramidite 35
 Ac-G-RNA-CPG 34, 37
 dG-CE Phosphoramidite 6, 10, 13, 14, 16, 18
 dmf-dG-CE Phosphoramidite 6, 10, 13, 14, 16, 18
 G-TOM-CE Phosphoramidite 33
 iPr-Pac-dG-CE Phosphoramidite 21
 iPr-Pac-G-RNA-CPG 37

GE Healthcare Life Sciences Instruments

CE Phosphoramidite 16
 Solvents and Reagents 17

Glen UnySupport™

Glen UnySupport CPG 22, 23
 Glen UnySupport FC CPG 23
 Glen UnySupport PS 22, 23

H

High Load CPG 27

I

Introduction 3, 4

M

MerMade Instruments

CE Phosphoramidites 14
 Solvents and Reagents 14
 Supports and Columns 15

O

OMe-RNA Synthesis

2'-OMe-RNA Phosphoramidites 38
 2'-OMe-RNA Supports 41

P

Polystyrene Supports

Glen UnySupport PS 22
 Universal Support III PS 24

Psoralen Labelling

Psoralen Azide 20

Q

Q-Supports 25, 26

R

RNA Supports

for 3' DNA Modification 32

RNA Synthesis

Minor RNA Phosphoramidites 37
 RNA Phosphoramidites 35
 RNA Supports 36, 37
 RNA Supports for TOM-RNA Synthesis 33, 34
 TOM-Protected Minor RNA Phosphoramidites 34
 TOM-Protected RNA Phosphoramidites 33

S

Saccharin 1-Methylimidazole 28

SMI 28

Sterling

Introduction 5

Sulfurizing Reagent 31

Sulfurizing Reagent II 31

T

T

dT-CE Phosphoramidite 6, 10, 13, 14, 16, 18

TOM-Protecting-Group

Ac-A-RNA-CPG 33
 Ac-C-RNA-CPG 34
 Ac-G-RNA-CPG 34
 A-TOM-CE Phosphoramidite 33
 C-TOM-CE Phosphoramidite 33
 G-TOM-CE Phosphoramidite 33
 U-RNA-CPG 34
 U-TOM-CE Phosphoramidite 33

U

U

2'-OMe-U-CE Phosphoramidite 38
 U-CE Phosphoramidite 35, 36
 U-RNA-CPG 32, 34, 37
 U-TOM-CE Phosphoramidite 33

UltraMILD Deprotection

2'-OMe-Ac-C-CE Phosphoramidite 39
 2'-OMe-iPr-Pac-G-CE Phosphoramidite 39
 2'-OMe-Pac-A-CE Phosphoramidite 39
 Ac-C-CE Phosphoramidite 36
 Ac-dC-CE Phosphoramidite 21
 Cap Mix A 21, 37, 40
 iPr-Pac-dG-CE Phosphoramidite 21
 iPr-Pac-G-CE Phosphoramidite 36
 Pac-A-CE Phosphoramidite 36
 Pac-dA-CE Phosphoramidite 21
 Potassium Carbonate in Methanol 21, 37, 40

UniCap Phosphoramidite 30

Universal Support III

Universal Support III PS 24

ORDERING

Orders may be placed by mail, telephone, fax or email to:

Glen Research Corporation
22825 Davis Drive, Sterling, VA 20164, USA
(800) 327-GLEN (USA)
(703) 437-6191 (International)
(800) 934-2490 (Fax USA)
(703) 435-9774 (Fax)
orders@glenres.com (Internet email)
<http://www.glenres.com> (World Wide Web Home Page)

There is no minimum order requirement. Our office hours are 9:30 a.m. to 5:30 p.m. EST, Monday through Friday. During this time, Glen Research representatives will be available to take your order and answer any questions you may have regarding our product line or DNA synthesis in general. Messages may be left on voice mail at any other time. Orders placed by 3:00 p.m. EST are normally shipped the same day.

DISCOUNTS

Glen Research offers a 10% discount on catalog products to educational institutions. In addition, discounts based on volume of usage are available, so please request a specific quotation. We are also happy to quote on bulk quantities or custom packaging of our products and on custom synthesis of unique materials.

TERMS AND CONDITIONS OF SALE

Delivery will be F.O.B. Glen Research, Sterling, VA. Freight charges will be prepaid by Glen Research and will be included on the invoice sent to the Customer.

Glen Research will issue an invoice to the Customer upon shipment of Products which shall be due and payable in full within thirty (30) days of the date of the invoice. Amounts not paid when due may incur an interest charge of one and one-half (1-1/2) percent per month until fully paid. Customer shall be responsible for all taxes on Products sold to it, including state and local sales and use taxes. We reserve the right to require payment in advance before shipping any materials ordered.

Glen Research warrants that each product conforms to the specifications for such product. If the Customer notifies Glen Research within thirty (30) days of its receipt of a product that the product does not conform to the specifications, Glen Research will, at its option, replace the product or return the purchase price paid by Customer. No replacement or refund will be made if the Customer does not notify Glen Research of a non-conforming product within said thirty (30) day period.

Glen Research makes no other express or implied warranty with respect to the products. Glen Research disclaims all implied warranties, including the warranties of merchantability and fitness for a particular purpose. Glen Research's liability for breach of warranty is limited to refund of purchase price paid. In no event shall Glen Research be liable for lost profits, loss of goodwill or any incidental, special or consequential damages even if advised of the possibility of same.

It is the responsibility of the Buyer to determine the suitability of any of the listed products for any specific purpose. Responsibility for accidents arising from the handling and use of the listed products rests solely with the Buyer. All of the products should be handled only by trained personnel who are aware of the potential hazards and have ready access to suitable safety equipment. All products supplied are primarily for research and development purposes and Glen Research products are not intended for use in foods or drugs, or for any commercial purpose.

PATENTS

As a research-oriented company, we realize the desirability of patents to cover original research and it is our policy to avoid infringing any approved patents. Accordingly, it is possible that some of our products may have to be withdrawn or adjusted in price as patents are approved and issued.

Oligo synthesis success. The first time and every time.

US Headquarters

Glen Research, LLC

22825 Davis Drive, Suite 100

Sterling, VA 20164

Phone: 703-437-6191

Fax: 703-435-9774

glenresearch.com

© 2018 Glen Research. All rights reserved. For research use only.
Not intended for animal or human therapeutic or diagnostic use.

