



OLIGONUCLEOTIDE SERVICES

For Us, Oligonucleotide Services go beyond Delivering just Convenience Products. Discover our Philosophy of total Customer Experience.

Optimised Application Oligos

- PCR Et Sequencing Primer
- Standard Vector Primer
- RAPD 10mer Kits
- qPCR Probes

Oligos à la Carte

- Unmodified DNA Oligos
- Modified DNA Oligos

Plate Oligos

RNA Oligos

- Unmodified RNA Oligos
- Modified DNA Oligos
- Chimeric Oligonucleotides

Large Scale Synthesis

Oligo Design Services

Optimised Application Oligos

We always endeavour to make your oligonucleotide ordering and practical experience the best it can possibly be. As a matter of course the quality of our oligonucleotides should consistently fulfil the performance criteria of your application and arrive in your lab right on time.

To this purpose we have developed **Optimised Application Oligos** to be used in standard PCR, sequencing, probe based qPCR and Random Amplified Polymorphic DNA (RAPD) applications.

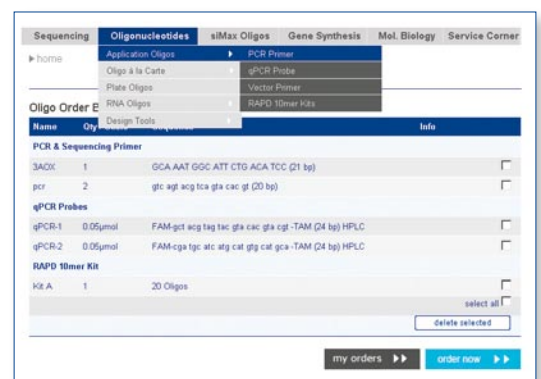
- PCR & Sequencing Primer
- Standard Vector Primer
- RAPD 10mer Kits
- qPCR Probes

Optimised Application Oligos have been proven to show highly consistent results in numerous experiments which have been performed in our in-house service laboratories and have been additionally validated in several external laboratories.

The specific formulation allows us to make your ordering process easier than ever before. In only a few clicks you will receive your optimum oligo in express time.

How You Benefit

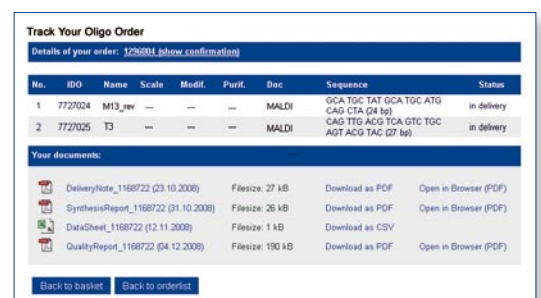
- Convenient online ordering due to predefined specifications
 - Only entry of primer name and sequence is needed
 - Copy & paste functionality
 - Upload options of existing primer lists (.xls, .csv, .txt)
- Free online design tools
- Oligo property analysis and calculation tools
- Online status tracking of order process and delivery
- Email notification when reports are available and oligos are in delivery



Screenshot of the Ecom homepage

Moreover, by taking advantage of the complete online driven pre- and post-ordering processes you can help contribute to saving our environment. All documentation can be downloaded online free of charge.

- Online Oligonucleotide Synthesis Report
- Online Quality Report inclusive MALDI-TOF MS spectra
- Online Oligonucleotide Data Sheet in .xls format
- Online Delivery Note



Screenshot of available online documents

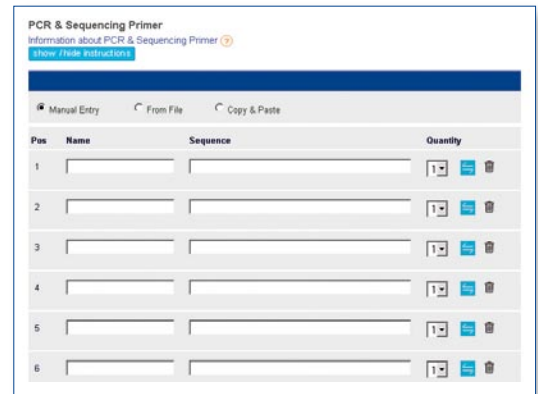
PCR & Sequencing Primer

You do not need to use your valuable time in calculating appropriate synthesis scales, puzzling about the right purification grades or even mulling over different documentation options.

Our new proprietary manufacturing process enables us to provide predefined primers with optimum specifications for your standard PCR and sequencing applications. All you need to enter is the primer name and respective sequence.

Specifications of Our PCR & Sequencing Primer

- Optimised for standard PCR and sequencing reactions
- Convenient online ordering via our Ecom System
- Yields of 30nmol for up to 3,000 PCRs
- For primer 15–29 bases in lengths
- Quality controlled by
 - Trityl monitoring
 - OD measurement
 - MALDI-TOF MS analysis
- Synthesis report, oligo data sheet, quality report and delivery note is provided online free of charge
- Delivery format: lyophilised
- Primers are shipped next day after Ecom order receipt



Screenshot of the PCR Primer Ecom order form

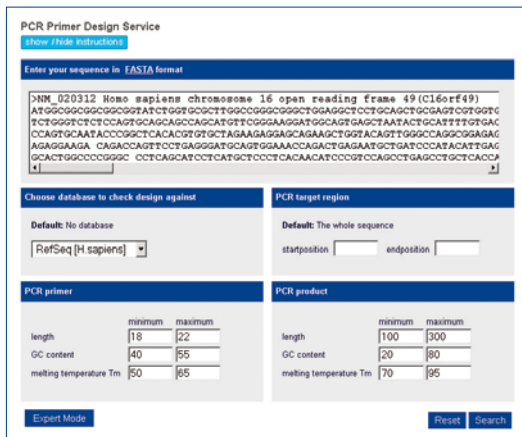
Numerous standard vector primers are available in our Ecommerce System. All sequences and respective physical properties are indicated—just select the vector primer of your choice for convenient ordering.

PCR Primer Design Tool

Eurofins MWG Operon offers an online PCR primer design tool which enables you to define specific primers easily by yourself. It can be found in the “Service Corner” in our Ecommerce System.

Our PCR Primer Design Tool suggests a range of optimal primers or pairs of primers for PCR, RT-PCR or sequencing, based on specific criteria of physical parameters. The primers are scored in relevance to the predicted best performance. The most favourable primers can be found at the first position.

The PCR Primer Design Tool can also be combined with a database search. The primers are checked against the RefSeq mRNA database (NCBI) to make sure that the primers have no critical mismatches.



PCR Primer Design Tool

NM_020312 Homo sapiens chromosome 16 open reading frame 49(C16orf49)						
	Ta	Sequence	Start_Stop	Length	GC	Tm
1.	Forward	ATGCTCCCTCACAACATCC	-	19	52.6	51.3
Order Now	Reverse	GCCAAAGTGTCTCTCAAAGTC	-	19	52.6	50.5
	Product	-	326-515	190	55.0	79.2
2.	Forward	ATGCTCCCTCACAACATCCC	-	20	55.0	53.8
Order Now	Reverse	CGCAAAGTGTCTCTCAAAGTC	-	20	55.0	53.5
	Product	-	326-516	191	56.0	79.3
3.	Forward	CATGCTCCCTCACAACATC	-	19	52.6	50.3
Order Now	Reverse	GCCAAAGTGTCTCTCAAAGTC	-	19	52.6	50.5
	Product	-	326-516	191	56.0	79.3
4.	Forward	TGCATTTTGTGACGCACC	-	19	50.0	51.4
Order Now	Reverse	TGTCTTCTCTTGTCTCTCC	-	19	52.6	50.3
	Product	-	136-236	101	56.4	78.0
5.	Forward	ATGCTCCCTCACAACATCCC	-	20	55.0	53.8
Order Now	Reverse	TCTTGATCATCACCAGCTC	-	20	55.0	54.0
	Product	-	328-498	161	55.9	78.8
6.	Forward	ATGCTCCCTCACAACATCC	-	19	52.6	51.3
Order Now	Reverse	CCATTTTCATTCATTAACCC	-	24	41.7	53.1
	Product	-	328-554	229	54.1	79.2
7.	Forward	ATGCTCCCTCACAACATCC	-	19	52.6	51.3
Order Now	Reverse	CCATTTTCATTCATTAACCC	-	24	41.7	53.1

Example of design results

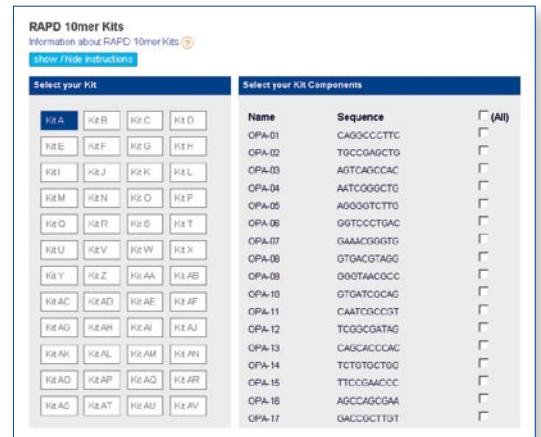
RAPD® 10mer Kits

Eurofins MWG Operon's RAPD® Kits contain 10mer primer specifically developed for Random Amplified Polymorphic DNA (RAPD) analysis, a technique used for DNA fingerprinting and genetic mapping.

In the RAPD technique, a single 10mer of arbitrary sequence is used as a primer in PCR to amplify genomic DNA where the sequence of the DNA is completely unknown. Genomic DNA from different individuals gives different PCR products, allowing the identification of DNA polymorphisms that can be used to identify different individuals or as genetic markers.

Specifications of Our RAPD® 10mer Kits

- Available as single primer or complete kits
- Convenient online ordering via our Ecom System
- Yields of 15nmol (3 OD)
- Quality controlled by
 - OD measurement
 - MALDI-TOF MS
- Synthesis report, oligo data sheet, quality report and delivery note is provided online free of charge
- Delivery format: lyophilised
- Primer are shipped next day after Ecom order receipt



Screenshot of the RAPD Kit Ecom order form

qPCR Probes

Quantitative PCR or Real Time PCR allows detection of the accumulation of PCR products during the amplification process in real time. This enables quantification of the number of templates present in the original sample before the PCR reaction has been started. For probe based qPCR, Eurofins MWG Operon offers

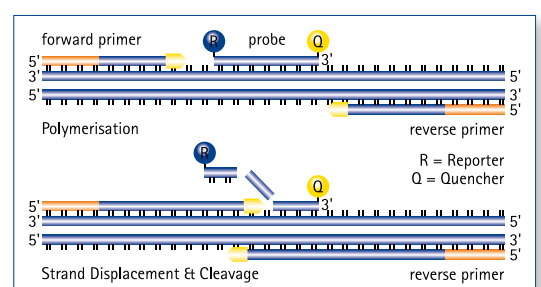
- Molecular Beacons
- Dual Labeled Probes

Dual Labeled Probes (Fluorogenic 5'-Nuclease Assay)

Dual Labeled Probes contain a fluorescent reporter and a quencher at their 5' and 3' ends, respectively. These probes can be used in quantitative PCR systems that take advantage of the 5'-3' exonuclease activity of DNA polymerase.

Principle:

A probe specific for the sequence of interest is used in PCR together with specific PCR primer. This probe is designed to anneal between the PCR primer. During the extension phase of PCR, the 5'-3' exonuclease activity of the DNA polymerase cleaves the fluorescent reporter from the probe. The amount of free reporter accumulates as the number of PCR cycles increases. The fluorescent signal from the free reporter is measured in real time and allows quantification of the amount of target sequence.



Oligos à la Carte

With the Oligo à la Carte you have the flexibility to set up your individual oligo specifications with the choice of four different purification levels for oligos 5–120 bases in length, various synthesis scales and modification options as well as a multitude of additional services.

Through the means of smart integrative menu functions, the order process has been designed for ultimate convenience while retaining a maximum range of options for

- Unmodified DNA Oligos
- Modified DNA Oligos
- PTO Oligonucleotides

How You Benefit

- Available in four different purification levels
- Five different synthesis scales
- Wobbles with non defined ratios can simply be ordered with IUPAC codes
- Multitude of modifications are available
- All modifications are HPLC purified by default
- Quality controlled by
 - Trityl monitoring
 - OD measurement
 - MALDI-TOF MS or CGE analysis
- Online synthesis report, data sheet and delivery note is provided online free of charge
- Delivery format: lyophilised

Additional Services

- Online quality report
 - with MALDI-TOF MS spectra for all oligos 5–60 bases in length
 - with CGE spectra for unmodified HPLC or HYPUR oligos >60 bases in length
- Printout of synthesis and quality report
- Printing of extra tube labels
- Wobbles with defined ratio*
- 3' Wobble* (start material)
- Concentration adjustment, multiple aliquoting and mixing of oligos in tubes

More to Benefit

- Convenient online ordering via our Ecommerce System
- Ecom function to calculate and order complementary sequences
- Interims page to display oligo properties and coloured sequence code
- Various selectable layouts of custom specific tube labels
- Email notification when synthesis report is available and oligos are in delivery
- Online status tracking of order process and delivery
- Personal order history with re-ordering option
- Access to all online documentation for 2 years

Screenshot of the Ecom order form for unmodified DNA oligos

Name	Sequence	GC	MW [g/mol]	Tm [°C]	Note
PTO_1	ATgtcAAAggtTAgac	44%	5376	47	
PTO_2	TAcagTTcccATctg	44%	5229	47	

Legend

Bases: DNA (blue), RNA (red), O-Methyl-RNA (green)

Bonds: Phosphor diester (black line)

Example of an interim page for PTO oligos

* Not available for IRD 700 and IRD 800.

Unmodified DNA Oligos

Unmodified DNA oligonucleotides are synthesised in our high throughput production facility, using highly automated synthesiser technologies, cleavage systems and purification methods in combination with a sophisticated, completely barcode driven labour management software (LIMS). For unmodified DNA oligos Eurofins MWG Operon offers

- Salt Free oligos
- HPSF® purified oligos
- HPLC purified oligos
- HYPUR purified oligos

Salt Free Oligos

- Synthesis on proprietary HTS synthesizer platforms
- Ultra high throughput cleavage and deprotection process
- Optimised for high coupling efficiency under salt-free conditions
- Excellent quality especially for longmers

Synthesis Scale ¹ [µmol]	0.01	0.05	0.20	1.00	10.00
Yield ² [nmol]	40	60	125	400	3,000
Yield ² [OD]	8	12	25	80	600
Length Restriction	5-50	5-120	5-120	5-120	5-120
Turnaround Time [wd]	1-2	1-2	2-3	2-3	2-3

HPSF® (High Purity Salt Free) Purified Oligos

- Proprietary cartridge purification based on reverse phase chromatography
- Cleaned from any toxic chemicals and n-x products
- Salt free and ready to use
- Minimum purity > 70%
- Excellent quality for all routine applications

Synthesis Scale ¹ [µmol]	0.01	0.05	0.20	1.00	10.00
Yield ² [nmol]	25	40	75	225	2,000
Yield ² [OD]	5	8	15	45	400
Length Restriction	5-50	5-120	5-120	5-120	5-120
Turnaround Time [wd]	1-2	1-2	1-2	2-3	2-3

HPLC Purified Oligos

- High chromatographic separation
- Free from most truncated failure sequences
- Increased amount of full length oligo in the final yield
- Minimum purity > 80%
- Recommended for more sensitive experiments like cloning, FISH or antisense applications

Synthesis Scale ¹ [µmol]	0.01	0.05	0.20	1.00	10.00
Yield ³ [nmol]	25	30	50	100	1,000
Yield ³ [OD]	5	7	10	20	200
Length Restriction	5-50	5-120	5-120	5-120	5-120
Turnaround Time [wd]	2-3	2-3	2-3	3-5	3-5

HYPUR® Purified Oligos

- Unique gel purification method based on Poly Acryl Gel Electrophoresis (PAGE)
- Highest available quality
- Minimum purity > 90%
- Recommended for unmodified oligonucleotides > 60mers

Synthesis Scale ¹ [µmol]	0.01	0.05	0.20
Length Restriction	5-50	5-120	5-120
Turnaround Time [wd]	4-6	5-8	5-8

Yields ³ [OD]	Yields ³ [nmol]
< 40mer: 5	< 40mer: 11
40mer-60mer: 4	40mer-60mer: 6
60mer-80mer: 3.5	60mer-80mer: 4

¹ The synthesis scale indicates the initial amount of 3' bases.

² Typical yield applies to a 20mer; Calculation: 1 OD = 5 nmol = 30 µg; may vary for sequences with GC content > 70%, > 3 purine stretches, or strong secondary structures.

³ Sequences with GC content > 70%, > 3 purine stretches or strong secondary structures may result in lower yields.

Modified DNA Oligos

Eurofins MWG Operon offers a wide variety of single and multiple modifications for DNA oligonucleotides in the categories

- Base, Sugar & Backbone Modifications
- Non Fluorescent Modifications
- Dye Modifications

Synthesis Scale ¹ [μmol]	0.01	0.05	0.20	1.00
Yield ² [nmol]	15	30	50	100
Yield ² [OD]	3	6	10	20
Length Restriction [bases]	5–50	5–80	5–80	5–80

Base, Sugar & Backbone Modifications

Modifications	5'	3'	Int.
Phosphorothioate bases (PTO)	x	x	x
2'-Deoxyinosine (INO)		x	x
2'-Deoxyuridine (URI)		x	x
5-Methyl-dC		x	x
Amino C6-dT			x
Biotin-dT			x
dSpacer (Deoxyabasic)			x
5'ddA; 5'ddG; 5'ddC; 5'ddT		x	
2',3' dideoxyC (3'ddC)		x	

Non Fluorescent Modifications

Modifications	5'	3'	Int.
Aminolink C6	x		
Aminolink C12	x		
Aminolink C3/C6/C7		x	
Biotin 3'		x	
Biotin 5'	x		
Biotin TEG	x	x	
Digoxigenin	x	x	x
Phosphorylation (PHOs)	x	x	
Thiol modifier	x	x	

Dye Modifications

One of the most common uncertainties when starting a new assay is how to select the best fluorescent label from all of the available options. The most important dye characteristics to review when choosing an appropriate dye are

- **Absorption and Emission Spectra of Fluorescent Dyes**
The absorbance of a dye quantifies how much of visible or UV light is absorbed by it. The emission value shows at which wavelength a fluorescent dye sends out light respective radiation.
- **Stoke-Shift**
The difference in energy between the excitation and emission maximum is known as the Stoke-Shift. With fluorescent dyes, a large Stoke-Shift is often desirable when optical filters are used to separate exciting light and fluorescence emission.
- **Extinction Coefficient**
This value is a direct measurement of the dye's ability to absorb light. The ability to absorb light will clearly have an effect on the amount of light it is able to emit.
- **pH Sensitivity**
Some fluorophores are more sensitive to alkaline or acid pH conditions because of the structural characteristic of their molecules. For example, in solutions > pH 9 some molecules such as IRD or Cy5.5 dyes could degrade, some other fluorophores like FAM or HEX are stable in alkaline as well as in acid pH ranges.
- **Stability to Photobleaching**
Photobleaching is the photochemical destruction of a fluorophore, which may impact the observation of fluorescent molecules, since they will eventually be destroyed by a constant light exposure.
- **Quantum Yield**
The fluorescence quantum yield (also quantum efficiency) gives the efficiency of the fluorescence process. It is defined as the ratio of the number of photons emitted to the number of photons absorbed. Generally, the maximum fluorescence quantum yield is 1.0 (100%).

¹ The synthesis scale indicates the initial amount of 3' bases.

² Typical yield applies to a 20mer; Calculation: 1 OD = 5 nmol = 30 ug; may vary for individual dyes, sequences with GC content > 70%, > 3 purine stretches, or strong secondary structures. ³ The maximum length of some oligonucleotides with 3' modifications is 50 bases.

Fluorescent Dyes – Labelling Position & Spectra

This table may help with your decision regarding which dyes to choose for your individual experiments.

Fluorescent Dye	Labelling Position			Absorption	Emission	Ext. Coefficient	Quencher Dyes	
	5'	3'	Int.				Dabcyl	BHQ-1
Alexa Fluor 350	x	x	x	346	442	19,000		
Bodipy 493/503	x	x	x	500	509	79,000		
Bodipy FL	x	x	x	504	510	70,000		
Oregon Green 488	x	x	x	496	516	76,000		
Alexa Fluor 488	x	x	x	495	519	71,000		
Oregon Green 500	x	x	x	499	519	84,000		
FAM	x			495	520	83,000		
FITC	x	x		495	520	73,000		
Fluorescein	x	x		495	520	83,000		
Fluorescein-dT			x	495	520	83,000		
Oregon Green 514	x	x	x	506	526	85,000		
Rhodamin Green	x	x	x	503	528	74,000		
TET	x			521	536	73,000		
Alexa Fluor 430	x	x	x	434	541	16,000		
Bodipy R6G-X	x	x	x	528	547	70,000		
JOE	x	x	x	520	548	73,000		
Yakima Yellow	x			530	549	84,000		
Bodipy 530/550	x	x	x	534	554	62,000		
HEX	x			535	556	73,000		
Alexa Fluor 555	x	x	x	555	565	150,000		
Bodipy 558/568	x	x	x	558	569	97,000		
Bodipy 564/570	x	x	x	563	569	142,000		
Bodipy TMR-X	x	x	x	544	570	56,000		
CY3	x			552	570	150,000		
TAMRA	x	x		544	576	90,000		
Rhodamin Red	x	x	x	560	580	129,000		
Bodipy 576/589	x	x	x	576	590	83,000		
Bodipy 581/591	x	x	x	581	591	136,000		
CY3.5	x			581	596	150,000		
ROX	x	x	x	575	602	82,000		
Texas Red	x	x	x	583	603	116,000		
Bodipy TR-X	x	x	x	588	616	68,000		
Alexa Fluor 610	x	x	x	612	628	132,000		
Bodipy 630/650	x	x	x	625	640	101,000		
Alexa Fluor 647	x	x	x	650	665	239,000		
Bodipy 650/665	x	x	x	650	665	101,000		
CY5	x			643	667	250,000		
CY5.5	x			675	694	250,000		
IRD700	x			685	705	170,000		
IRD800	x			787	807	200,000		

TAMRA

Eclipse

BHQ-2

Although the data presented in this table have been checked for accuracy, the emission and absorption maximums may vary slightly with each oligonucleotide.

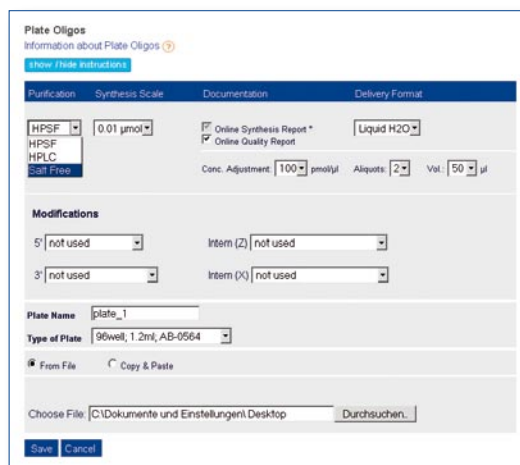
Plate Oligos

Our unique high throughput synthesis platform enable us to offer thousands of oligonucleotides in parallel, optimised for a wide range of genomic applications.

We can adapt to the demands of different requirements and specifications that best suit the individual projects of our customers.

How You Benefit

- Appropriate for all big design and synthesis projects
- Available in 3 purification levels:
 - Salt Free
 - HPSF®
 - HPLC
- Oligo lengths: 5–120 bases
- Modifications available
- Quality control by
 - Trityl monitoring
 - OD measurement
 - MALDI-TOF MS
- Online synthesis report, data sheet and delivery note is provided online free of charge
- Printed plate overview is included
- Delivery format: dissolved in H₂O or lyophilised



Screenshot of the Ecom order form for Plate Oligos

Additional Services

- Online quality report with MALDI-TOF MS spectra for oligos 5–60 bases in length
- Printout of synthesis report available
- Printout of quality report can be ordered
- Wobbles with defined ratio are available
- Concentration adjustments (50–500µM)
- Multiple aliquoting options
- Mixing of oligos available

More to Benefit

- Convenient online ordering via our Ecommerce System
 - Copy & Paste functionality
 - Simple upload of xls, txt or csv oligo files
 - No special file format is needed
- Order forms for email ordering are available
- Fast turn around times due to high capacity
- Email notification when reports are available and oligos are in delivery
- Online status tracking of order process and delivery
- Personal order history
- Access to all online documents for 2 years



Screenshot of the Ecom plate overview page

RNA Oligos

In our production facilities, single strand RNA is synthesised and purified with state-of-the-art technology to meet the highest quality standards. With our long term experience in nucleic acid synthesis we have developed a method which enables us to achieve the highest coupling efficiency to maximise the yield of full length products. Our RNA oligos are available as

- Unmodified RNA
- Modified RNA
- Chimeric Oligonucleotides

How You Benefit

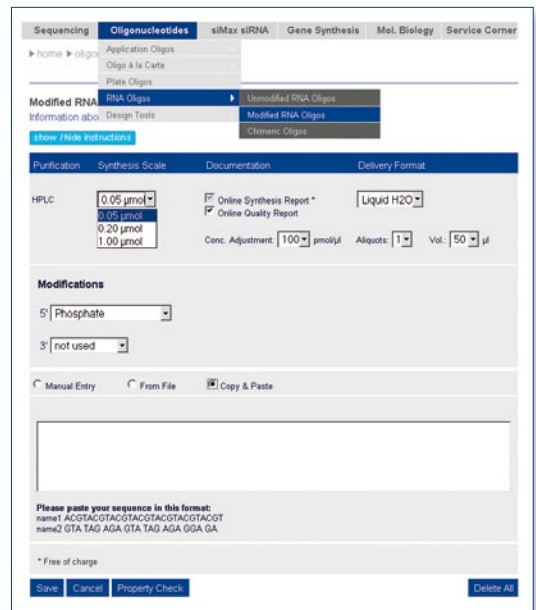
- Guaranteed minimum yields
- Guaranteed purities based on CGE analysis
 - Desalted > 70%
 - RP-HPLC purified > 90%
 - Modified RNA > 80%
- Quality controlled by
 - Trityl monitoring
 - OD measurement
 - MALDI-TOF MS
- Oligo lengths: 10–40 bases
- Online synthesis report, data sheet and delivery note is provided online free of charge
- Delivery format: lyophilised

Additional Services

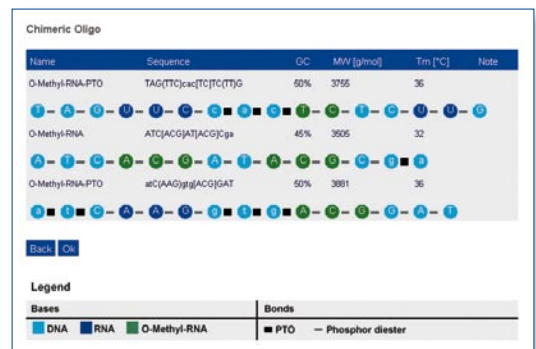
- Online quality report incl. MALDI-TOF MS spectra
- Printed quality report can be ordered
- Printing of extra tube labels is available
- Concentration adjustment
- Multiple aliquoting options
- Mixing of oligos available

More to Benefit

- Convenient online ordering via our Ecommerce System
- Interim page to display oligo properties and coloured sequence code
- Ecom function to calculate and order complementary sequences
- Various selectable layouts of custom specific tube labels
- Email notification when synthesis report is available and oligos are in delivery
- Online status tracking of order process and delivery
- Personal order history with re-ordering option
- Access to all online documents for 2 years



Screenshot of the Ecom menu and order form for RNA oligos



Interim page to display the properties of chimeric oligos

Unmodified RNA Oligos

After cleavage and deprotection, unmodified RNA oligonucleotides are routinely purified either by desalting or by RP-HPLC.

Synthesis Scale ¹ [μmol]	Guaranteed Yield ² [nmol]		Guaranteed Yield ² [OD]	
	Desalted	RP-HPLC	Desalted	RP-HPLC
0.05	7	5	1.5	1
0.20	30	15	6	3
1.00	50	30	10	6

Modified RNA Oligos

Modified RNA oligonucleotides can be labelled at the 3' or 5' end of the RNA and are purified by RP-HPLC.

5' Modifications	3' Modifications	Synthesis Scale ¹ [μmol]	0.05	0.20	1.00
FAM, HEX, TET	Amino C7	Guaranteed Yield ² [nmol]	30	50	100
Cy3, Cy5	Biotin	Guaranteed Yield ² [OD]	6	10	20
Amino C6	Biotin (TEG)	Turnaround Time [wd]	5-7		
Biotin	Phosphate				
Cholesteryl	Fluorescein				
Phosphate					

Chimeric Oligonucleotides

Chimeric oligonucleotides consist of mixed DNA and RNA bases including methylated or phosphorothioate versions in various numbers and compositions.

- 2'-O-Methyl-RNA
- 2'-O-Methyl-RNA-PTO
- RNA-PTO

Synthesis Scale ¹ [μmol]	0.05	0.20	1.00
Yield ³ [nmol]	30	50	100
Yield ³ [OD]	6	10	20
Length Restriction ⁴ [bases]	5-80	5-80	5-80

Large Scale Synthesis

Using state-of-the-art synthesiser technology, Eurofins MWG Operon is able to address the specific requirements of its customers for high quality, medium to large scale DNA oligonucleotides.

How You Benefit

- Fully customised service
- High product yields
- Consistent high quality without any batch variations
- Different purification options
 - Purification by desalting
 - RP-HPLC purification
 - IE-HPLC purification
- Various QC analysis options
 - MALDI-TOF MS
 - Capillary gel electrophoresis (CGE)
 - Analytical HPLC
- Modifications, normalisation and aliquoting are available on request

¹ The synthesis scale indicates the initial amount of 3' bases.

² Yield and purity may be lower for sequences with a GC content > 70%, containing three or more purine stretches or strong secondary structures.

³ Typical yield applies to a 20mer; Calculation: 1 OD = 5 nmol = 30 ug; may vary for individual dyes, sequences with GC content > 70%, > 3 purine stretches, or strong secondary structures.

⁴ The maximum length of some oligonucleotides with 3' modifications is 50 bases.

Quality Assurance

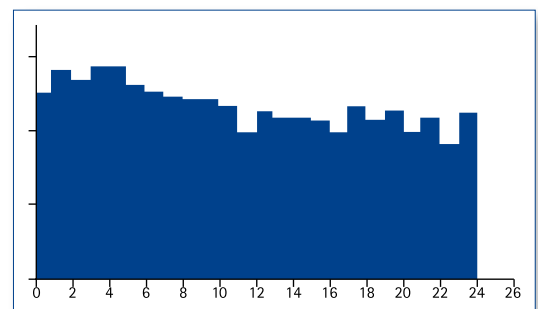
Quality control is the most fundamental part of our DNA/RNA synthesis service.

- Order entry via our SSL-encoded online ordering system (Ecom) ensures the confidentiality of your data.
- Our barcode driven LIMS system is able to detect any human based error sources over the whole manufacturing process.
- Oligonucleotide synthesis is controlled by continuous online trityl monitoring
- The quality, quantity and identity of the end product is ensured by
 - OD measurement
 - MALDI-TOF mass spectrometry or
 - Capillary gel electrophoresis (CGE)

In addition, Eurofins MWG Operon performs a continuous entry quality control of all chemical reagents, and is certified according to DIN EN ISO 9001:2000.

Trityl Monitoring

We use trityl monitoring to measure the coupling efficiency during oligonucleotide synthesis. This method involves measuring the absorbance of the trityl cation produced from the cleavage of the trityl moiety from a growing oligonucleotide chain. The trityl concentration is determined UV-spectrophotometrically by the absorbance of the trityl cation at 498 nm.



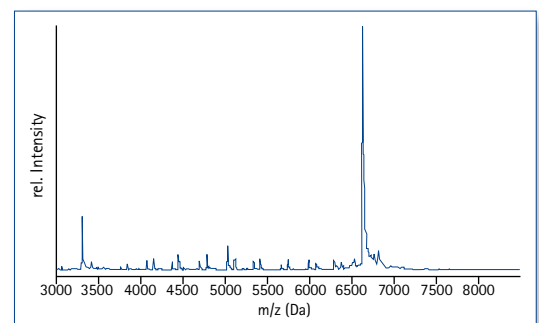
Trityl monitoring during synthesis

Measurement of Optical Density (OD)

One OD₂₆₀ (optical density) unit of DNA is the amount of DNA that gives an absorbance reading of 1.0 at a wavelength of 260 nm, for a sample dissolved in 1.0 ml total volume of ddH₂O, read in a 1 cm quartz cuvette. 1 OD₂₆₀ corresponds to approximately 33 µg/ml of single stranded DNA, depending on the GC content.

MALDI-TOF Mass Spectroscopy

To ensure the identity and qualitative purity of each and every synthesised oligonucleotide, Eurofins MWG Operon uses the latest generation of MALDI-TOF (Matrix Assisted Laser Desorption Ionisation – Time of Flight) mass spectrometers. This high grade of automation and the use of proprietary software to analyse the spectra, ensures the delivery of oligonucleotides of the highest quality.

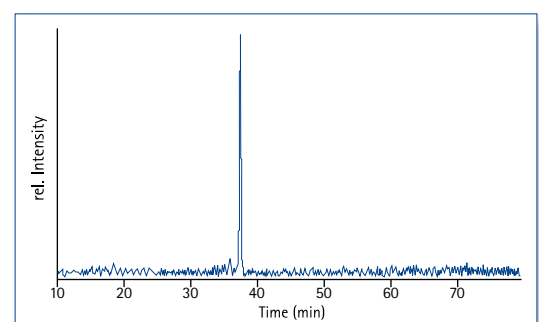


Spectrum of a MALDI-TOF analysis

Capillary Gel Electrophoresis (CGE)

CGE is an effective method for checking the quantitative purity of a synthesised oligonucleotide and an alternative solution to MALDI-TOF for analysing the quality of longer oligos.

At Eurofins MWG Operon a capillary gel electrophoresis (CGE) analysis is performed for unmodified oligonucleotides > 60 bases purified by RP-HPLC or HYPUR®.



Spectrum of a CGE analysis

Oligo Design Services

For a specific and convenient design of primer for PCR, RT-PCR or sequencing, probes for qPCR applications, or siRNA, Eurofins MWG Operon provides you free of charge with

Online Design Tools

- PCR Primer Design
- Sequencing Primer Design
- qPCR Primer and Probe Design
- siRNA Design

Alternatively, our bioinformatic team can support you in design projects with several hundred oligonucleotides, or any other specific design needs.

Oligo Design Project Services

- Design of PCR primer and RT-PCR primer
 - for the amplification of a specific amount of genes or RNA sequences, e.g. splice variants
 - for a defined number of genes up to complete transcriptomes
- Design of specific qPCR probes and primer for probe based qPCR applications
- Design of 50mer–70mer oligos for microarray expression analysis – Custom Array Ready Longmers (CARL)
- Predesigned 70mer microarray oligos for more than 40 organisms

All design projects include a highly specific comparison with our proprietary data bases. Your data will be handled with absolute confidentiality, all comparisons are performed internally.

Oligo Property Screen (MOPS)

Eurofins MWG Operon's Oligo Property Screen (MOPS) tool gives you the option of checking your oligos before you order. It also facilitates the set-up of experiments by calculating the adequate amounts and dilution factors for your oligo solutions. You can enter DNA as well as RNA sequences and you can attach or insert modifications to your oligos to check

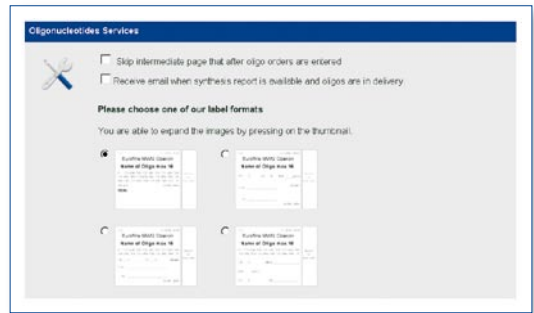
- **Physical Properties**
It specifies all physical attributes of your oligo such as GC content, annealing temperature, molecular weight, extinction coefficient, etc.
- **Oligo Structure**
Calculates the secondary structure of an oligo. For DNA secondary structure prediction the mfold package is used. The RNAfold program is used for prediction of RNA secondary structures.
- **BLASTn Analysis**
Provides a number of databases to align your oligo against human, murine and rat sequence databases.
- **Dimer/PCR Check**
Tests your oligos against itself or another oligo for dimer formation or performs a PCR viability check for a primer pair.
- **OD Calculator**
Calculates the optical density of your oligo using a set-up of experimental conditions. This tool is designed to show the relationship between OD and amount of your oligo.
- **Dilution Calculator**
Determine how much volume is needed to dilute an oligo stock solution of higher concentration down to a specific lower concentration. Stock volumes and final volumes can be defined as well.

More Features of Your Online Account

Personal Preferences

Within your account you can select your personal order preferences or general settings such as

- Order confirmation to 3rd parties by email
- Email notification when synthesis report is available and oligos are in delivery
- Selectable layouts of custom specific tube labels

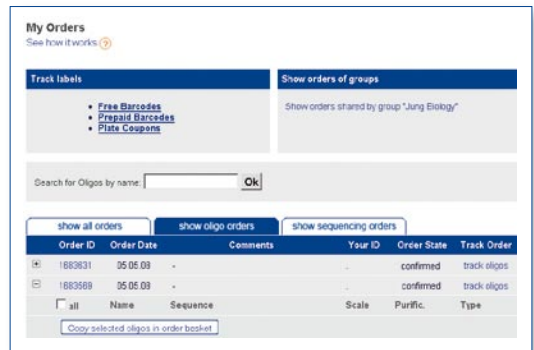


Screenshot of personal preferences within Ecom

Order Tracking & Order History

In your personal Ecom account all your order data and documentation are stored. The order history features:

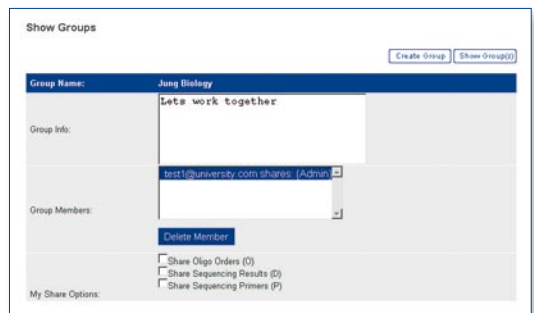
- Tracking of the process status and the delivery status of your orders
- Downloading of order confirmations and delivery notes
- Viewing and downloading of data sheets, synthesis and quality reports
- Secure data download and storage of 2 years
- Convenient search and re-order option



Screenshot of order tracking and order history page

Group Administration

The Group Administration tool allows you to share oligo orders, sequencing data and stored sequencing primer with other researchers. You can create research groups and invite persons of your choice to share specific information.



Screenshot of the Group Administration

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Feel Free to Contact Us

If you should have any technical questions regarding our products, or questions regarding an order, or you should need any assistance placing an order, please contact our customer support team at any time.



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