Competent cells for expert transformation

Bio-Rad offers competent cells for both electroporation and chemical transformation. Electro-competent cells provide the efficiencies necessary for more demanding cloning applications such as the construction of genomic and cDNA libraries, while chemi-competent cells provide high-efficiency convenience for most routine cloning experiments. Bio-Rad offers four choices of competent *E. coli* for your transformation needs.

**EP-Max™10B and EP-Max10B F' Electro-Competent Cells**

These cells have been developed to achieve maximum electroporation efficiencies. Highly transformable EP-Max10B and EP-Max10B F' *E. coli* strains are provided in convenient 0.10 ml vials to maintain quality and performance. Simply thaw the cells, add DNA, and electroporate. Use Bio-Rad’s MicroPulser™ or Gene Pulser Xcell™ system to ensure consistent electrotransformation.

While the versatile EP-Max10B and EP-Max10B F' genotypes may be used for many applications, their very high transformation efficiencies make them ideal for demanding applications, such as establishing genomic or cDNA libraries. Additionally, EP-Max10B F' cells may be used for ssDNA production since they can be infected with bacteriophage M13. The *lacIq* gene permits regulation of *lac*, *tac*, and *trc* promoters.

**EP-Max10B Electro-Competent Cells**

- Transformation efficiencies >1 x 10\(^{10}\)
- Blue/white screening for recombinants
- *endA* and *recA* mutations for high quality, high plasmid copy numbers, and a lowered risk of recombination
- Bacterial restriction system mutations for more representative libraries

**EP-Max10B F' Electro-Competent Cells**

- Transformation efficiencies >1 x 10\(^{10}\)
- Regulatable expression due to the *lacIq* gene
- Blue/white screening for recombinants
- *endA* and *recA* mutations for high quality, high plasmid copy numbers, and a lowered risk of recombination
- Bacterial restriction system mutations for more representative libraries
- Susceptible to infection by bacteriophage M13

Comparison of transformation efficiency of electro-competent cells. A and B are comparable strains from the top two suppliers of competent cells.
C-Max™5α and C-Max5α F’ Chemi-Competent Cells

C-Max5α and C-Max5α F’ E. coli strains are provided in convenient 0.2 ml or 0.05 ml single-use aliquots to maintain consistent performance without loss of transformation efficiency due to repeated freeze-thawing. Simply thaw the cells, add DNA, and complete your protocol.

Both cell types are perfect for many cloning applications, including those requiring large plasmid constructs. C-Max5α F’ chemi-competent cells provide all of the features of C-Max5α cells but also contain an F’ episome and the lacIq gene, which permits regulation of lac, tac, and trc promoters.

<table>
<thead>
<tr>
<th>Cell Type</th>
<th>Transformation Method</th>
<th>Genotype</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP-Max 10B</td>
<td>Electroporation</td>
<td>F’ mcrA Δ(mrr-hsdRMS-mcrBC) ϕ80lacZΔM15 ΔlacX74 deoR recA1 endA1 araD139 Δ(ara, leu)7697 galU galK rpsL nupG λ’</td>
</tr>
<tr>
<td>EP-Max10B F’</td>
<td>Electroporation</td>
<td>mcrA Δ(mrr-hsdRMS-mcrBC) ϕ80lacZΔM15 ΔlacX74 deoR recA1 endA1 araD139 Δ(ara, leu)7697 galU galK rpsL nupG λ’/F’[lacIqZΔM15 Tn10 (Tetr)]</td>
</tr>
<tr>
<td>C-Max5α</td>
<td>Chemical transformation</td>
<td>F’ ϕ80lacZΔM15 Δ(lacZYA–argF)U169 recA1 endA1 hsdR17(rK−, mK+) phoA supE44 λ’ thi-1 gyrA96 relA1</td>
</tr>
<tr>
<td>C-Max5α F’</td>
<td>Chemical transformation</td>
<td>ϕ80lacZΔM15 Δ(lacZYA–argF)U169 recA1 endA1 hsdR17(rK−, mK+) phoA supE44 λ’ thi-1 gyrA96 relA1/F’[lacIq Tn10 (Tetr)]</td>
</tr>
</tbody>
</table>

C-Max5α Chemi-Competent Cells

- Transformation efficiencies >1 x 10⁹
- Mutations facilitating transfection with large plasmids
- Blue/white screening for recombinants
- endA and recA mutations for high quality, high plasmid copy numbers, and a lowered risk of recombination

C-Max5α F’ Chemi-Competent Cells

- Transformation efficiencies >1 x 10⁹
- Mutations facilitating transfection with large plasmids
- Regulatable expression due to the lacIq gene
- Blue/white screening for recombinants
- endA and recA mutations for high quality, high plasmid copy numbers, and a lowered risk of recombination
- Susceptible to infection by bacteriophage M13

Comparison of transformation efficiency of chemi-competent cells. A and B are comparable strains from the top two suppliers of competent cells.
### Summary of Cloning Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>EP-Max10B</th>
<th>EP-Max10B F'</th>
<th>C-Max5α</th>
<th>C-Max5α F'</th>
</tr>
</thead>
<tbody>
<tr>
<td>cDNA library construction</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Genomic library construction</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>endA mutation for high plasmid copy number and quality</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>recA mutation for suppression of recombination</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Accepts large plasmids</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Blue/white colony screening for recombinants</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Susceptibility to bacteriophage M13 infection for ssDNA production</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>lacIq gene for regulatable expression</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Ordering Information

**Electro-Competent Cells**
- **Catalog #**: 170-3330
  - **Description**: EP-Max10B Electro-Competent Cells, 5 x 0.1 ml
- **Catalog #**: 170-3331
  - **Description**: EP-Max10B F' Electro-Competent Cells, 5 x 0.1 ml

**Chemi-Competent Cells**
- **Catalog #**: 170-3340
  - **Description**: C-Max5α Chemi-Competent Cells, 5 x 0.2 ml
- **Catalog #**: 170-3342
  - **Description**: C-Max5α Chemi-Competent Cells, 10 x 0.05 ml
- **Catalog #**: 170-3344
  - **Description**: C-Max5α Chemi-Competent Cells, 5 x 0.2 ml
- **Catalog #**: 170-3343
  - **Description**: C-Max5α Chemi-Competent Cells, 10 x 0.05 ml

**Related Product Ordering Information**

**Electroporation Systems**
- **Catalog #**: 165-2100
  - **Description**: MicroPulser Electroporator, universal voltage, includes chamber with leads, 10 sterile cuvettes (5 packs of 0.1 cm and 0.2 cm gap)
- **Catalog #**: 165-2262
  - **Description**: Gene Pulser Xcell Microbial System, 100/240 V, 50/60 Hz, includes main unit, PC module, ShockPod chamber, 10 sterile cuvettes (5 each of 0.1 and 0.2 cm gap), instructions

**Cuvettes**
- **Catalog #**: 165-2083
  - **Description**: MicroPulser/Gene Pulser® Cuvettes, 0.1 cm gap, 5 (mini pack)
- **Catalog #**: 165-2089
  - **Description**: MicroPulser/Gene Pulser Cuvettes, 0.1 cm gap, 50 (standard pack)
- **Catalog #**: 165-2093
  - **Description**: MicroPulser/Gene Pulser Cuvettes, 0.1 cm gap, 500 (lumbo pack)
- **Catalog #**: 165-2082
  - **Description**: MicroPulser/Gene Pulser Cuvettes, 0.2 cm gap, 5 (mini pack)
- **Catalog #**: 165-2086
  - **Description**: MicroPulser/Gene Pulser Cuvettes, 0.2 cm gap, 50 (standard pack)
- **Catalog #**: 165-2092
  - **Description**: MicroPulser/Gene Pulser Cuvettes, 0.2 cm gap, 500 (lumbo pack)

### Related Products and Information

**Cytofectene™ Transfection Reagent**
- Cytofectene is a powerful, ready-to-use cationic lipid transfection reagent. Cytofectene transfection reagent provides the highest transformation efficiencies with many cell types, high transformation efficiency in the presence of serum, minimal cytotoxicity, and a simple one-step, one-tube transformation procedure. Cytofectene is suitable for both adherent and suspension cultures and is effective for both transient and stable expression.

**XenoWorks™ System**
- XenoWorks is a complete line of instrumentation designed for the rigorous demands of the latest microinjection and micromanipulation techniques. The system features ergonomic height-adjustable joystick controls, micromanipulator position memories, and variable movement radius. Microinjection, whether the delivery of DNA solution to a zygote's pronucleus, or insertion of embryonic stem cells into a blastocyst, can be achieved with a level of control previously unattainable with conventional instruments.

**Biolistics**
- Biolistics technology, or particle bombardment, is a direct physical method of delivering nucleic acids or other molecules into cells. The Helios® gene gun and the PDS-1000/He™ systems provide easy-to-use, rapid, versatile gene delivery that is independent of cell type, requires small amounts of DNA, and requires few cells. This technology can be applied in vivo or in vitro to the widest range of targets, including cell cultures, tissues, organs, plants, and animals. These instruments effectively use a helium pulse to accelerate high-density gold or tungsten particles, coated with nucleic acids, directly into the target cells.

**Electroporation**
- Electroporation is a highly efficient technique for introducing nucleic acids, proteins, and other molecules into a wide variety of cells. The Gene Pulser Xcell™ electroporator is a flexible, modular system that delivers exponential or square-wave pulses optimal for your cell type. With an intuitive interface, fully manual setting, preset programs, and "optimize" capability, the Gene Pulser Xcell electroporator provides power and reliability. For more routine, high-throughput bacterial or fungal applications, the MicroPulser™ electroporator provides simple, efficient, reproducible delivery.