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NEB 5-alpha Competent *E. coli* (High Efficiency)

No dry ice charges with competent cells.
Also available in **Electrocompetent format**.

Catalog #	Size	Concentration	Price	Qty	
C2987P	1 x 96 well plate (20 µl/well)		\$459.00	<input type="text" value="1"/>	
C2987I	6 x 0.2 ml/tube		\$144.00	<input type="text" value="1"/>	
C2987H	20 x 0.05 ml/tube		\$184.00	<input type="text" value="1"/>	

Categories: [Cloning & Mutagenesis Products](#), [Cloning Strains](#)

Applications: [BioBrick® Assembly](#), [Gibson Assembly® Cloning](#), [Gibson Assembly®](#) | [More +](#)

Product Information	FAQs	Protocols	Other Tools & Resources	Related Products
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- ☒ [Description](#)
- ☒ [Advantages and Features](#)
- ☒ [Properties and Usage](#)
- ☒ [Quality Control](#)

Description

Chemically competent *E. coli* cells suitable for high efficiency transformation in a wide variety of applications. Available in 3 convenient formats:

- Single use 50 µl vials
- 200 µl vials
- 96-well plate

Highlights

- DH5α™ derivative
- Free of animal products
- Transformation efficiency: 1 - 3 x 10⁹ cfu/µg pUC19 DNA
- Efficient transformation of unmethylated DNA derived from PCR, cDNA and many other sources (*hsdR*)
- Activity of nonspecific endonuclease I (*endA1*) eliminated for highest quality plasmid preparations
- Resistance to phage T1 (*thiA2*)
- Suitable for blue/white screening by α-complementation of the β-galactosidase gene
- Reduced recombination of cloned DNA (*recA1*)
- K12 Strain

Genotype

thiA2 Δ(argF-lacZ)U169 phoA glnV44 Φ80 Δ(lacZ)M15 gyrA96 recA1 relA1 endA1 thi-1 hsdR17

Reagents Supplied

The following reagents are supplied with this product:

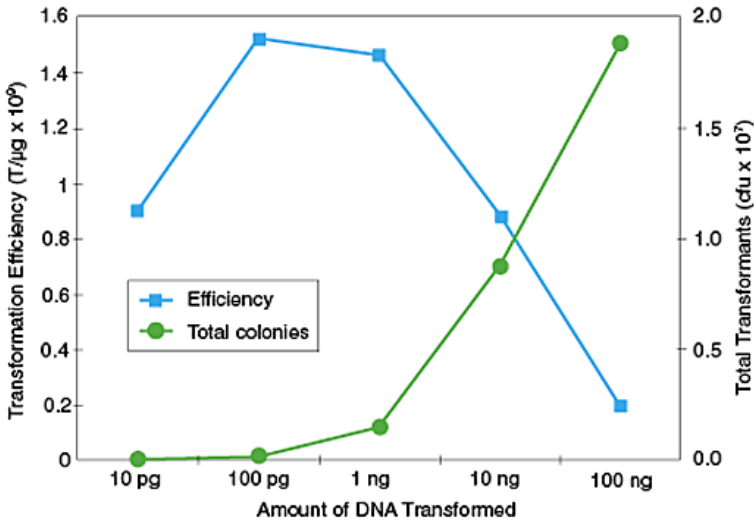
	Store at (°C)	Concentration
pUC19 Transformation Control Plasmid	-20	0.05 ng/μl
SOC Outgrowth Medium	4	1X

Advantages and Features

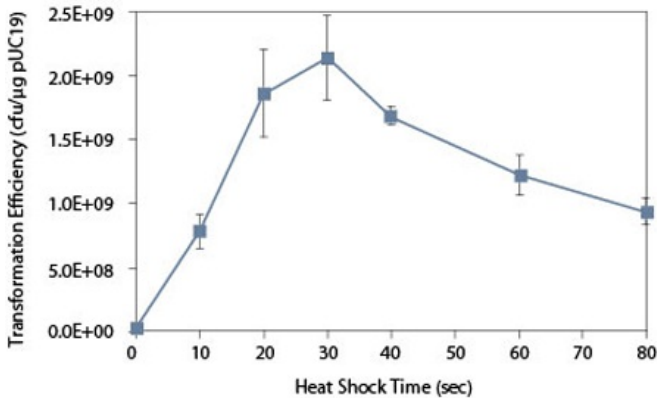
Features

- Versatile cloning strain
- DH5α™ derivative

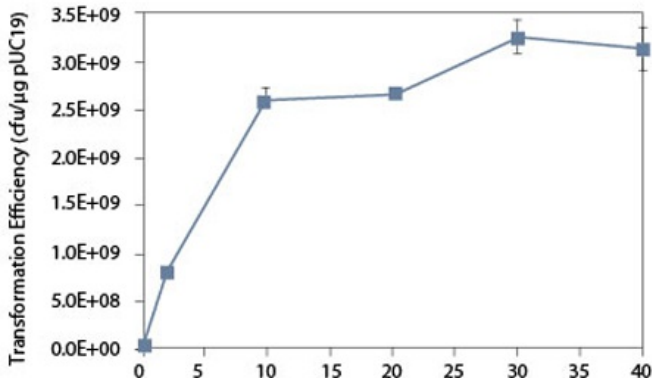
Applications



DNA Effects on Transformation Efficiency and Colony Output: The optimal amount of DNA to use in a transformation reaction is lower than commonly recognized. Using clean, supercoiled pUC19, the efficiency of transformation is highest in the 100 pg-1 ng range. However, the total colonies which can be obtained from a single transformation reaction increase up to about 100 ng.

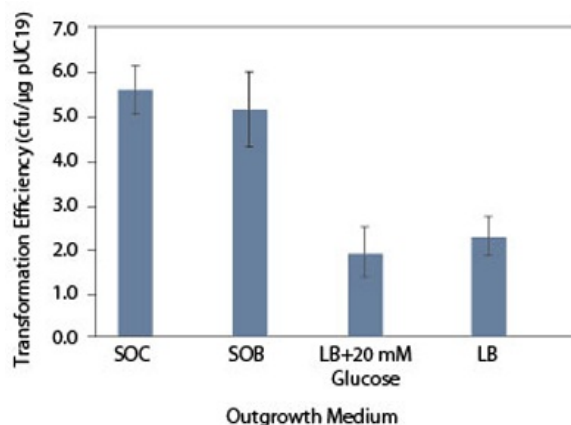


Effect of heat shock time on NEB 5-alpha competent E.coli transformation efficiency: 50 μl of competent cells were transformed with 100 pg of pUC19 control DNA following the provided High Efficiency Transformation Protocol except heat shock time varied from 0 to 80 seconds.

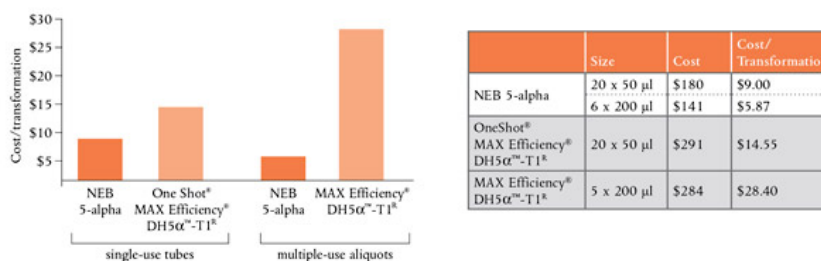


DNA Incubation Time (min)

Effect of DNA incubation time on NEB 5-alpha competent E.coli transformation efficiency: 50 µl of competent cells were transformed with 100 pg of pUC19 control DNA following the provided High Efficiency Transformation Protocol except DNA incubation time varied from 0 to 40 minutes.

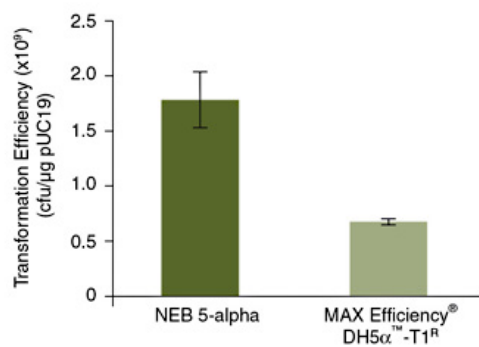


Effect of outgrowth medium on transformation efficiency: 50 µl of NEB 5-alpha competent E.coli was transformed with 100 pg of pUC19 control DNA following the provided High Efficiency Transformation Protocol with the exception of varying the outgrowth medium. NEB SOC outgrowth medium delivers the highest transformation efficiency.



Calculations were based on list price and recommended transformation volumes.

Take advantage of the low cost per transformation with NEB 5-alpha. Calculations were based on list price and recommended transformation volumes.



Benefit from the high transformation efficiencies of NEB 5-alpha: The transformation efficiencies of NEB 5-alpha and DH5α were compared using each manufacturers' recommended protocols. Values shown are the average of triplicate experiments.

Properties and Usage

Antibiotics for Plasmid Selection	Working Concentration
Ampicillin	100 µg/ml
Carbenicillin	100 µg/ml
Chloramphenicol	33 µg/ml
Kanamycin	30 µg/ml

Streptomycin	25 µg/ml
Tetracycline	15 µg/ml

Storage Temperature
-80°C

Shipping Notes
• Ships on dry ice

Antibiotic Resistance
• none

Quality Control

Quality Control Assays

The following Quality Control Tests are performed on each new lot and meet the specifications designated for the product. Individual lot data can be found on the Product Summary Sheet/Datacard or Manual which can be found in the Supporting Documents section of this page.

- **Transformation Efficiency:**
The competent cells are tested for transformation efficiency and pass minimum release criteria. Transformation efficiency is defined as the number of colony forming units (cfu) which would be produced by transforming 1 µg of plasmid into a given volume of competent cells.




Notes

1. **CAUTION:** This product contains DMSO, a hazardous material. Review the MSDS before handling.
2. **STORAGE AND HANDLING:** Competent cells should be stored at -80°C. Storage at -20°C will result in a significant decrease in transformation efficiency. Cells lose efficiency whenever they are warmed above -80°C, even if they do not thaw.

Supporting Documents




















Material Safety Datasheets




























The following is a list of Material Safety Data Sheets (MSDS) that apply to this product to help you use it safely. The following file naming structure is used to name these document files: [Product Name] MSDS. For international versions please contact us at info@neb.com.

-  NEB 5-alpha Competent *E. coli* (High Efficiency) MSDS
-  pUC19 Vector MSDS
-  SOC Outgrowth Medium MSDS

Datacards

The Product Summary Sheet, or Data Card, includes details for how to use the product, as well as details of its formulation and quality controls. The following file naming structure is used to name the majority of these document files: [Catalog Number]Datasheet-Lot[Lot Number]. For those product lots not listed below, please contact NEB at info@neb.com or fill out the [Technical Support Form](#) for appropriate document.

-  C2987Datasheet-Lot205
-  C2987Datasheet-Lot206
-  C2987Datasheet-Lot207
-  C2987Datasheet-Lot209
-  C2987Datasheet-Lot210
-  C2987Datasheet-Lot215
-  C2987Datasheet-Lot219
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-  C2987Datasheet-Lot292
-  C2987Datasheet-Lot2831402
-  C2987Datasheet-Lot285
-  C2987Datasheet-Lot3001404
-  C2987Datasheet-Lot3031405
-  C2987Datasheet-Lot3051405
-  C2987Datasheet-Lot3181405
-  C2987Datasheet-Lot3081405
-  C2987Datasheet-Lot3171405
-  C2987Datasheet-Lot3071405
-  C2987Datasheet-Lot3071407
-  C2987Datasheet-Lot3091406
-  C2987Datasheet-Lot3101406
-  C2987Datasheet-Lot3191406
-  C2987Datasheet-Lot3191407
-  C2987Datasheet-Lot3111408

1. Can I store competent cells at -20°C instead of -80°C?
2. Do you carry competent cells which are compatible with Gateway® Cloning?
3. How can I increase transformation efficiency?
4. How long should I incubate cells on ice after DNA has been added (NEB #C2987H and NEB #C2987I)?
5. How should I calculate the transformation efficiency (C2987)?
6. What are the solutions/recipes (C2987)?
7. What are the strain properties (C2987)?
8. What is the difference between NEB #C2987H and NEB #C2987I?
9. What is the difference between NEB #C2988J and NEB #C2987H?
10. What is the optimal heat shock time for this strain (NEB #C2987H and NEB #C2987I)?
11. What type of competent cells are suitable for transformation of DNA constructs created using Gibson Assembly?
12. Which strain of Competent *E. coli* should I use for general cloning?
13. Which kind of transformation tubes should be used?
14. What volume of DNA can be added into competent cells?
15. Are NEB's competent cells compatible with the "Plate and Go" protocol?
16. What is the shelf life for this strain (NEB #C2987H and NEB #C2987I)?
17. Can the 96-well plate format of NEB 5-alpha Competent *E. coli*, NEB #C2987P, be separated into smaller sections?
18. How does the transformation efficiency of the 96-well plate format (NEB #C2987P) compare to the other formats?
19. What is the optimal heat shock time for the 96-well plate format NEB 5-alpha Competent *E. coli* (NEB #C2987P)?
20. I am competing in the iGEM competition. Do you have any products that I should consider purchasing from NEB?

1. 5 Minute Transformation Protocol (C2987H/C2987I)
2. High Efficiency Transformation Protocol (C2987H/C2987I)
3. High Efficiency Transformation Protocol for 96-well format (C2987P)

- ☑ Selection Tools
- ☑ Application Notes

- ☑ Usage Guidelines & Tips
- ☑ Citations

Selection Tools

- [E. coli Strains Supplied by NEB](#)
- [Competent Cell Selection Guide](#)
- [Cloning Competent Cell Transformation Selection Chart](#)
- [Competent Cell Product Comparison](#)
- [Strain Properties](#)

Usage Guidelines & Tips

- [Additional E. coli Strain Genotypes](#)
- [Convenient Formats of Competent Cells](#)
- [Genetic Markers](#)
- [McrA, McrBC and EcoKI Strain Phenotypes](#)
- [Restriction of Foreign DNA by E. coli K-12](#)

Application Notes

-  [Enhancing Transformation Efficiency C2987](#)

Citations

- Mascher G, Derman Y, Kirk DG, Palonen E, Lindström M, Korkeala H (2014) The CLO3403/CLO3404 Two-Component System of *Clostridium botulinum* E1 Beluga Is Important for Cold Shock Response and Growth at Low Temperatures *Appl Environ Microbiol* 80(1), 399-407. PubMedID: [24185852](#), DOI: 10.1128/AEM.03204-13
- McEvoy CR, Tsuji B, Gao W, Seemann T, Porter JL, Doig K, Ngo D, Howden BP, Stinear TP (2013) Decreased vancomycin susceptibility in *Staphylococcus aureus* caused by IS256 tempering of WalKR expression *Antimicrob Agents Chemother* 57(7), 3240-9. PubMedID: [23629723](#), DOI: 10.1128/AAC.00279-13

Companion Products

- [NEB 5-alpha Competent E. coli \(Subcloning Efficiency\)](#)
- [NEB 5-alpha Electrocompetent E. coli](#)
- [NEB 5-alpha F⁺ Competent E. coli \(High Efficiency\)](#)

Materials Sold Separately

- [SOC Outgrowth Medium](#)