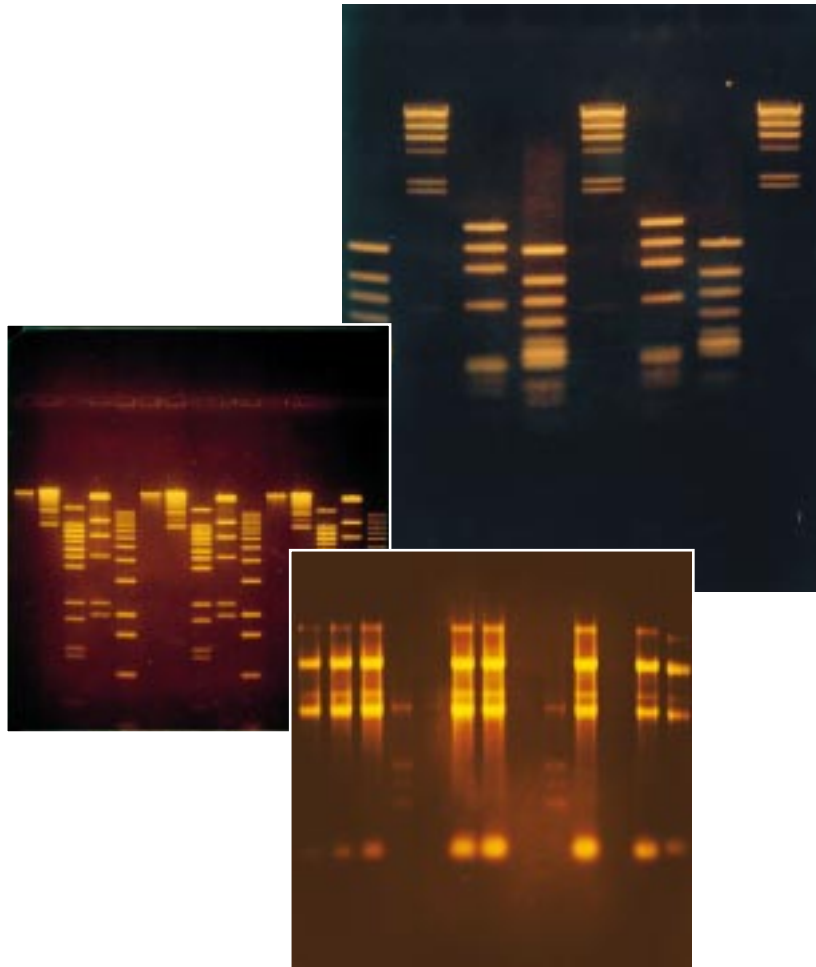


The Complete Submarine Family



Everything For Sub

Hoefer HE series units are constructed of clear plastic for easy viewing. All three models feature no-tape gel casting.

HE 33 Mini Submarine Electrophoresis Unit:

- Mini gel size: 7 × 10 cm.
- Prechill coolant-filled buffer chamber base for high voltage runs without heat distortion.
- Apply up to 32 samples on one gel.



HE 99X Max Submarine Electrophoresis Unit:

- Three gel sizes: 15-cm wide × 10-, 15-, or 20-cm long.
- Offers the best value in versatility and durability.
- Apply up to 60 samples per gel.

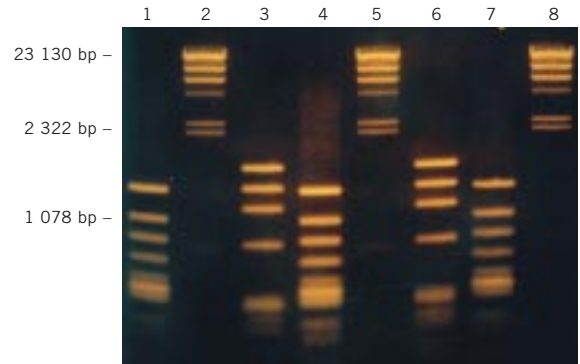
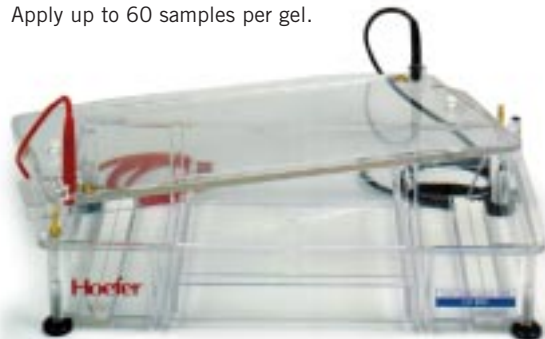


Fig 1. Cooled HE 33 Mini Submarine unit separation of DNA markers. Lanes 1, 4, 7: ϕ X-174 RF DNA-*Hind* II digest; lanes 2, 5, 8: lambda DNA-*Hind* III digest; and lanes 3, 6: ϕ X-174 RF DNA-*Hae* III digest. Markers were separated for 30 min at 200 V using a 1% agarose gel.

Voltage (V)	Gradient (V/cm)	Time (min)
500	40	5*
400	31	10*
300	24	20*
200	16	30 to 60
150	12	30 to 60

*Base chilled to -20 °C.

Voltage settings and maximum recommended separation time using 1% agarose, 0.5X TBE, and a chilled base.

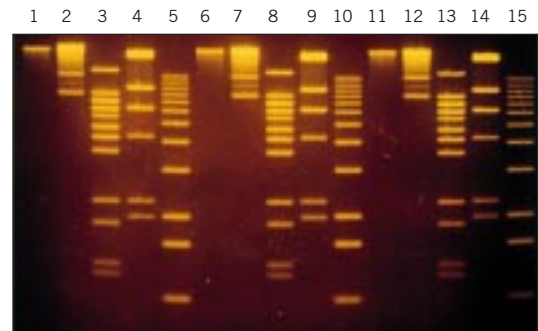


Fig 2. HE 99X results: 0.75% agarose, 0.5X TBE, 100 V, 3.5 h. Lanes 1, 6 and 11: lambda; lanes 2, 7 and 12: BRL high molecular weight standards; lanes 3, 8 and 13: lambda/*BstE* II; lanes 4, 9 and 14: lambda/*Hind* III; lanes 5, 10 and 15: 1 kb ladder.

Submarine Electrophoresis

HE 100 SuperSub™ Submarine

Electrophoresis Unit:

- Three gel sizes: 20-cm wide × 15-, 20-, or 25-cm long.
- Built-in heat exchanger provides effective temperature control and allows higher voltage runs without loss of resolution.
- Internal buffer circulation is safe and minimizes ion depletion during long runs.
- Speed-load with standard multi-channel pipettes and 20-well combs.
- Ideal for RNA separations, field inversion gel electrophoresis and high-throughput analysis.
- Up to 144 samples with 4 × 36 well combs on 25 cm gel.

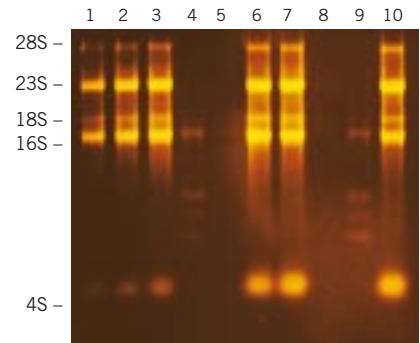


Fig 3. HE 100 SuperSub separation of RNA markers. Markers were run on a 4-mm thick 1% agarose-formaldehyde gel in 1X MOPS buffer for 16 h at 35 V. The temperature was maintained at 15 °C, and the buffer was recirculated. Lanes 1, 2, 3, 6, 7, and 10: 15 µg each of an RNA marker set (28S, 23S, 18S, 16S and 4S); lanes 4 and 9: 15 µg of a different RNA marker set (1.6 kb, 1.0 kb, 0.6 kb, 0.4 kb and 0.3 kb bands).

GNA series are molded for leak-free operation. Both models feature broad red stripes under sample wells to improve well visibility for sample loading.

GNA 100 Mini Submarine

Electrophoresis Unit:

- Two gel sizes: 5.2 × 7.6 cm and 7.6 × 10 cm.

GNA 200 Submarine Electrophoresis Unit:

- Standard gel size: 20 × 20 cm.
- Cooling plate allows temperature control for fast runs without compromising separations, especially with low-melting point agarose.



Field Inversion Gel Electrophoresis (FIGE) and Pulsed Field Gel Electrophoresis (PFGE)

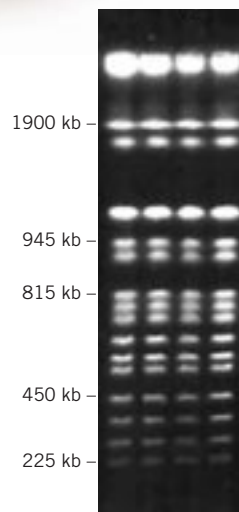
Hoefler PC 500 SwitchBack™: Economical FIGE

Hoefler PC 500 SwitchBack Pulse Controller extends the range of DNA separation on standard submarine electrophoresis units up to 1 000 kb. For outstanding FIGE results, build a system with the SwitchBack Pulse Controller, HE 100 SuperSub submarine electrophoresis unit, EPS power supply, and the MultiTemp III thermostatic circulator.



Gene Navigator™: Powerful and Versatile Pulsed Field Gel Electrophoresis System

The Gene Navigator offers a choice between the Hexagonal or Point Electrode Kit for optimal electrical field shape for DNA separations up to 10 Mb. The system consists of a control unit, an electrophoresis unit, and an electrode kit. Add a power supply and a thermo-static circulator to complete the system.



Specification Guide: Submarine Electrophoresis Units

Model	Gel Size (W × L, cm)	Unit Dimension (W × L, cm)	Electrode Distance (cm)	Maximum Samples per gel	Cooling System	Buffer Volume (ml)	Maximum Buffer Rating
HE 33	7 × 10	13 × 24	13	32	Filled base	150–250	500 V, 500 mA, 15 W
HE 99X		18.2 × 36	26			1 000–1 200	200 V, 100 mA, 20 W
Tray I	15 × 10			60			
Tray II	15 × 15			60			
Tray III	15 × 20			60			
HE 100		25 × 32	29		Built-in heat exchanger	1 000–1 500	500 V, 500 mA, 40 W
Tray I	20 × 15			72			
Tray II	20 × 20			72			
Tray III	20 × 25			144			
GNA 100		20.5 × 9.2	17.5			300–400	300 V, 660 mA, 200 W
Tray I	7.6 × 10			22			
Tray II	5.2 × 7.6			14			
GNA 200	20 × 20	35 × 21.5	27.7	60	Built-in cooling plate	1 500–2 000	300 V, 660 mA, 200 W
Gene Navigator	15 × 15 20 × 20	39.5 × 38	28	46 22	Built-in heat exchanger	2 500–3 000	450 V, 500 mA, 225 W

Companion Products

- Power supplies
- MacroVue UV and visible transilluminators
- ImageMaster™ VDS video documentation system and analysis software
- MultiTemp™ III thermostatic circulator



Related Reagents

- A wide range of DNA markers for precise sizing of restriction fragments, PCR products and other DNAs.
- λ and Yeast DNA PFGE markers for sizing DNA molecules from ~ 50 to 1 900 kb.
- Agaroses for analytical and preparative applications.
- Ethidium bromide for fluorescent nucleic acid detection.

Ordering information

Product	Code No.	Product	Code No.
HE 33 Mini Submarine Electrophoresis Unit, Basic Includes: gel running tray, gel casting tray and bubble level. (Order comb and comb back separately)	80-6052-64	HE 100 SuperSub Submarine Electrophoresis Unit, Basic Includes: bubble level. (Order casting kit, comb back and comb separately.)	80-6043-90
HE 33 Mini Submarine Electrophoresis Unit, Complete Includes: basic unit, 1.5-mm thick 8-well comb, comb back.	80-6052-45	HE 100 SuperSub Submarine Electrophoresis Unit, Complete Includes: basic unit, 1.0-mm thick 20-well comb, 20 × 25 cm running plate and 20 × 25 cm casting tray.	80-6043-71
Comb back with 2 screws for HE 33 comb	80-6050-36	HE 100 Gel Casting Kit 20 × 15 cm 20 × 20 cm 20 × 25 cm Includes: casting and running trays.	80-6048-84 80-6049-03 80-6049-22
Gel casting kit with casting tray and running tray, 7 × 10 cm	80-6053-78	Comb back with 3 screws for HE 100 combs	80-6046-56
HE 99X Max Submarine Electrophoresis Unit, Basic (Order gel casting kit, comb and comb back separately)	80-6061-38	<i>See table for available combs.</i>	
HE 99X Max Submarine Electrophoresis Unit, Complete Includes: basic unit, 15 × 20 cm gel casting kit, one 1.5-mm thick 15-well comb, and comb back.	80-6061-57		
Comb back for HE 99X combs with 2 screws	80-6054-35		
HE 99X Gel Casting Kits Kit, 15 × 10 cm Kit, 15 × 15 cm Kit, 15 × 20 cm Includes: gel casting tray and UVT gel running tray.	80-6060-62 80-6060-81 80-6061-00		

Ordering information

Product	Code No.
GNA-100 Submarine Electrophoresis Unit Includes: gel table and gel tray I (7.6 × 10 cm), gel table and gel tray II (5.2 × 7.6 cm), 11-well comb for gel tray I, 7-well comb for gel tray II.	18-2400-02
GNA-200 Submarine Electrophoresis Unit Includes: gel tray (20 × 20 cm), 22-well comb (1 mm).	18-2300-02
Gel Trays	
Gel Trays for GNA-100	
7.6 × 10 cm Gel tray I	18-2409-01
5.2 × 7.6 cm Gel tray II	18-2410-01
Gel Tray for GNA-200	
20 × 20 cm	18-2310-01
<i>See table for available combs.</i>	
Gene Navigator Electrophoresis Unit	
115 VAC	18-1019-18
230 VAC	18-1019-19
Includes: pump for buffer circulation, cooling coil, safety lid with cable, insert molds, gel staining tray, silicon tubing, hose connectors, hose clamps.	
Gene Navigator Control Unit, for either 115 VAC or 230 VAC.	18-1026-17
Hexagonal Electrode Kit	18-1019-20
Includes: hexagonal electrode, gel support tray (15 × 15 cm), gel casting frame (15 × 15 cm), 1-mm thick 12- or 23-well comb, 2-mm thick 12- or 23-well comb, 2-mm thick preparative comb making 1 or 2 wells.	
Point Electrode Kit	18-1019-23
Includes: 6 cathode electrodes, 2 anode electrodes, gel support tray (20 × 20 cm), gel casting frame (20 × 20 cm), 2-mm thick 22-well comb.	
PC 500 SwitchBack Pulse Controller	
115 VAC	80-6073-92
230 VAC	80-6074-11
Requires gel electrophoresis unit and power supply.	
EPS 301 Power Supply	18-1130-01
300 V, 400 mA, dual output power supply	
Hoefler EPS 2A200 Power Supply	80-6406-99
200 V, 2A, dual output power supply	

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Printed in the USA

Product	Combs			Code No.
	Wells			
	No.	Thickness (mm)	Width (mm)	
HE 33 Combs^a				
1/2 ^b	1.0	44/6	80-6051-88	
1/2 ^b	1.5	44/6	80-6052-07	
8	1.0	6.5	80-6051-50	
8	1.5	6.5	80-6051-69	
12	1.0	3.9	80-6050-74	
12	1.5	3.9	80-6050-93	
16	1.0	2.6	80-6051-12	
16	1.5	2.6	80-6051-31	
HE 99X Combs^c				
1/2 ^b	1.0	113/10	80-6057-39	
1/2 ^b	1.5	113/10	80-6057-58	
1/2 ^b	3.0	113/10	80-6057-77	
10	1.5	9.7	80-6055-68	
10	3.0	9.7	80-6055-87	
15	1.0	7.1	80-6056-06	
15	1.5	7.1	80-6056-25	
15	3.0	7.1	80-6056-44	
20	1.0	4.7	80-6056-63	
20	1.5	4.7	80-6056-82	
20	3.0	4.7	80-6057-01	
30	1.0	3.0	80-6057-20	
HE 100 Combs^d				
1/2 ^b	1.0	176/5	80-6046-75	
1/2 ^b	1.5	176/5	80-6046-94	
1/2 ^b	3.0	176/5	80-6047-13	
1/3 ^b	1.0	83/5	80-6047-32	
12	1.0	13.7	80-6044-47	
12	1.5	13.7	80-6044-66	
12	3.0	13.7	80-6044-85	
20	1.0	7.3	80-6045-04	
20	1.5	7.3	80-6045-23	
20	3.0	7.3	80-6045-42	
30	1.0	4.5	80-6045-61	
30	3.0	4.5	80-6045-80	
36	1.0	3.0	80-6045-99	
36	1.5	3.0	80-6046-18	
36	3.0	3.0	80-6046-37	
GNA Combs				
for GNA-100 Gel Tray I				
1/2 ^b	1	54/3	18-1019-46	
1/2 ^b	2	54/3	18-1019-47	
5	1	10	18-1019-45	
8	1	5	18-1019-43	
8	2	5	18-1019-44	
11	1	3	18-1019-42	
for GNA-100 Gel tray II				
1/2 ^b	1	30/3	18-1019-50	
1/2 ^b	2	30/3	18-1019-51	
5	1	5	18-1019-49	
7	1	3	18-1019-48	
for GNA-200				
1/2 ^b	1	170/3	18-1019-55	
1/2 ^b	2	170/3	18-1019-58	
14	1	10	18-1019-54	
14	2	10	18-1019-57	
22	1	5	18-1019-53	
22	2	5	18-1019-56	
30	1	3	18-1019-52	

GNA Combs

for GNA-100 Gel Tray I

1/2 ^b	1	54/3	18-1019-46
1/2 ^b	2	54/3	18-1019-47
5	1	10	18-1019-45
8	1	5	18-1019-43
8	2	5	18-1019-44
11	1	3	18-1019-42

for GNA-100 Gel tray II

1/2 ^b	1	30/3	18-1019-50
1/2 ^b	2	30/3	18-1019-51
5	1	5	18-1019-49
7	1	3	18-1019-48

for GNA-200

1/2 ^b	1	170/3	18-1019-55
1/2 ^b	2	170/3	18-1019-58
14	1	10	18-1019-54
14	2	10	18-1019-57
22	1	5	18-1019-53
22	2	5	18-1019-56
30	1	3	18-1019-52

^a Without back. Order 80-6050-36 comb back separately.

^b Preparative/Reference wells.

^c Without back. Order 80-6054-35 comb back separately.

^d Without back. Order 80-6046-56 comb back separately.

