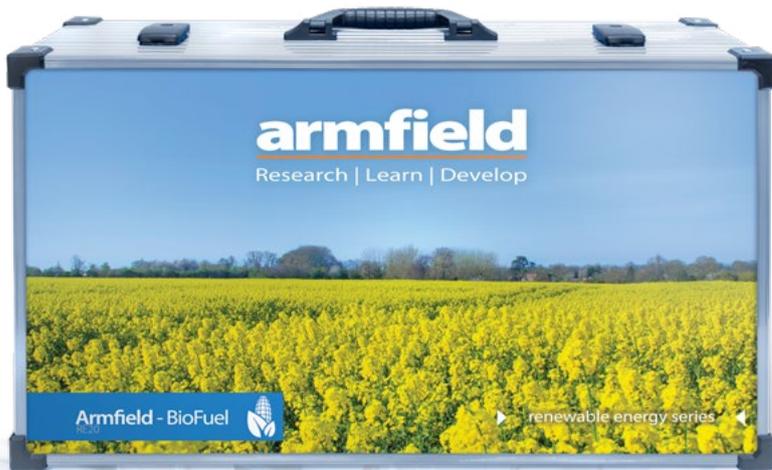


The Armfield advanced renewable energies range is a specialised learning system for the technical education in universities and vocational training centres.

The kits cover Photovoltaic and Wind Energy generation, Fuel Cell and Battery Technology, Thermal Energy and the construction of a controllable Smart Grid on a laboratory scale.



PROVIDES AN IN-DEPTH UNDERSTANDING INTO THE GENERATION OF BIOETHANOL & BIODIESEL

“The entire process of producing biofuel is demonstrated with the Armfield Bio-Fuel kit in the form of student experiments.

The suitcase contains all necessary parts and components and can be used from any location. Our first step is resource selection and fermentation.

The resulting mash is then distilled with the custom-built condenser and the resulting ethanol will be characterized.

Lastly, the produced bio fuel needs to be converted into usable energy - for example into electricity with the provided ethanol fuel cell.

The Armfield Biofuel kit does not only cover bio ethanol production but also the generation of biodiesel through transesterification of fats.”

Supplied in an aluminium case



Features / benefits

- ▶ Includes an Ethanol-fuel cell for the generation of electrical energy out of biofuel
- ▶ Production of biofuel displayed in experiments for students
- ▶ Interdisciplinary experiments for chemistry, physics and biology
- ▶ All additional devices already included - usable without laboratory equipment

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USA office - email: info@armfield.inc tel: +1 (609) 208-2800 (USA only)

Issue: 1

URL: <http://www.armfield.co.uk/re>

Applications

ME ChE CE IP

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Experimental content

Biofuel experiments:

- ▶ Production of biodiesel (FAME) from fats and oils
- ▶ Extraction of fats from groceries or oil plants
- ▶ Differences between cooking oil and FAME
- ▶ Fermentation on the basis of different sugars
- ▶ Proof of CO₂ by a calcium hydroxide solution
- ▶ Link between reaction speed and temperature
- ▶ Distillation of fermented mash
- ▶ Working principle of the fuel cell
- ▶ Recording the characteristic curve of a 15% solution
- ▶ Temperature dependence of the power
- ▶ Concentration dependence of the power and the characteristic curve



Ethanol fuel cell powering the propeller

Requirements

Scale



1Ph



Electrical supply: 110-230V AC 50-60Hz

- ▶ Level and stable work surface
- ▶ 1 x Supplementary BioFuel
- ▶ 1 x Bunsen burner (Not supplied by Armfield)

Overall dimensions

Tray

Length	0.640m
Width	0.165m
Height	0.370m

Packed and crated shipping specifications

Volume	0.038m ³
Gross weight	10Kg

Related curriculums

- ▶ Renewable Energies
- ▶ Chemical Engineering
- ▶ Environmental Engineering

Ordering specification

- ▶ 1 x Potentiometer module
- ▶ 1 x Motor module without gear
- ▶ 1 x Ethanol fuel cell module
- ▶ 1 x Plug with hose
- ▶ 1 x Yeast
- ▶ 1 x Chain clamp
- ▶ 2 x Digital multi-meter
- ▶ 3 x Test lead black 25 cm
- ▶ 2 x Test lead red 25 cm
- ▶ 4 x Bump on transparent 5.0 mm height X 11.1mm diameter
- ▶ 1 x Propeller
- ▶ 1 x Laboratory thermometer
- ▶ 1 x Distilling head, 2 cores 75°, NS 19/26
- ▶ 1 x Condenser
- ▶ 1 x Alcoholmeter
- ▶ 1 x Erlenmeyer flask 1000ml
- ▶ 1 x Airlock
- ▶ 1 x Rubber stopper
- ▶ 1 x Areometer
- ▶ 1 x Beaker 250ml
- ▶ 3 x Test tubes
- ▶ 1 x Grip stopper
- ▶ 3 x Pasteur pipette
- ▶ 1 x Measuring cylinder 100ml
- ▶ 1 x Syringe 2ml
- ▶ 1 x Silicone ring
- ▶ 1 x Info sheet initial startup
- ▶ 1 x Universal stand clamp
- ▶ 1 x Stand rod 60cm, M10
- ▶ 2 x Double clamp
- ▶ 1 x Stand base plate
- ▶ 1 x Aluminium case BioFuel
- ▶ 1 x BioFuel Manual

Essential accessories / equipment

- ▶ **RE21:** Biofuel Clamp Set

Other products in the advanced renewable energies range

- ▶ **RE10:** Advanced Photovoltaic Energy
- ▶ **RE12:** Advanced Wind Energy
- ▶ **RE14:** Advanced Fuel Cell Technology
- ▶ **RE16:** Advanced Thermal Energy
- ▶ **RE24:** Advanced Battery Technology

Operational conditions

- ▶ Storage Temperature: -10°C to +70°C
- ▶ Operating temperature range: +10°C to +50°C
- ▶ Operating relative humidity range: 0 to 95%, non-condensing

Ordering codes

- ▶ **RE20:** Bio-Fuel
- ▶ **RE21:** Biofuel Clamp Set

Armfield standard warranty applies with this product

Knowledge base

- > 28 years expertise in research & development technology
- > 50 years providing engaging engineering teaching equipment

Benefit from our experience, just call or email to discuss your laboratory needs, latest project or application.

An ISO 9001:2015 Company



Products CE certified

armfield.co.uk

Aftercare

Installation
Commissioning
Training
Service and maintenance
Support: armfieldassist.com