



WORDS AND PHOTOS MARK ALLEN

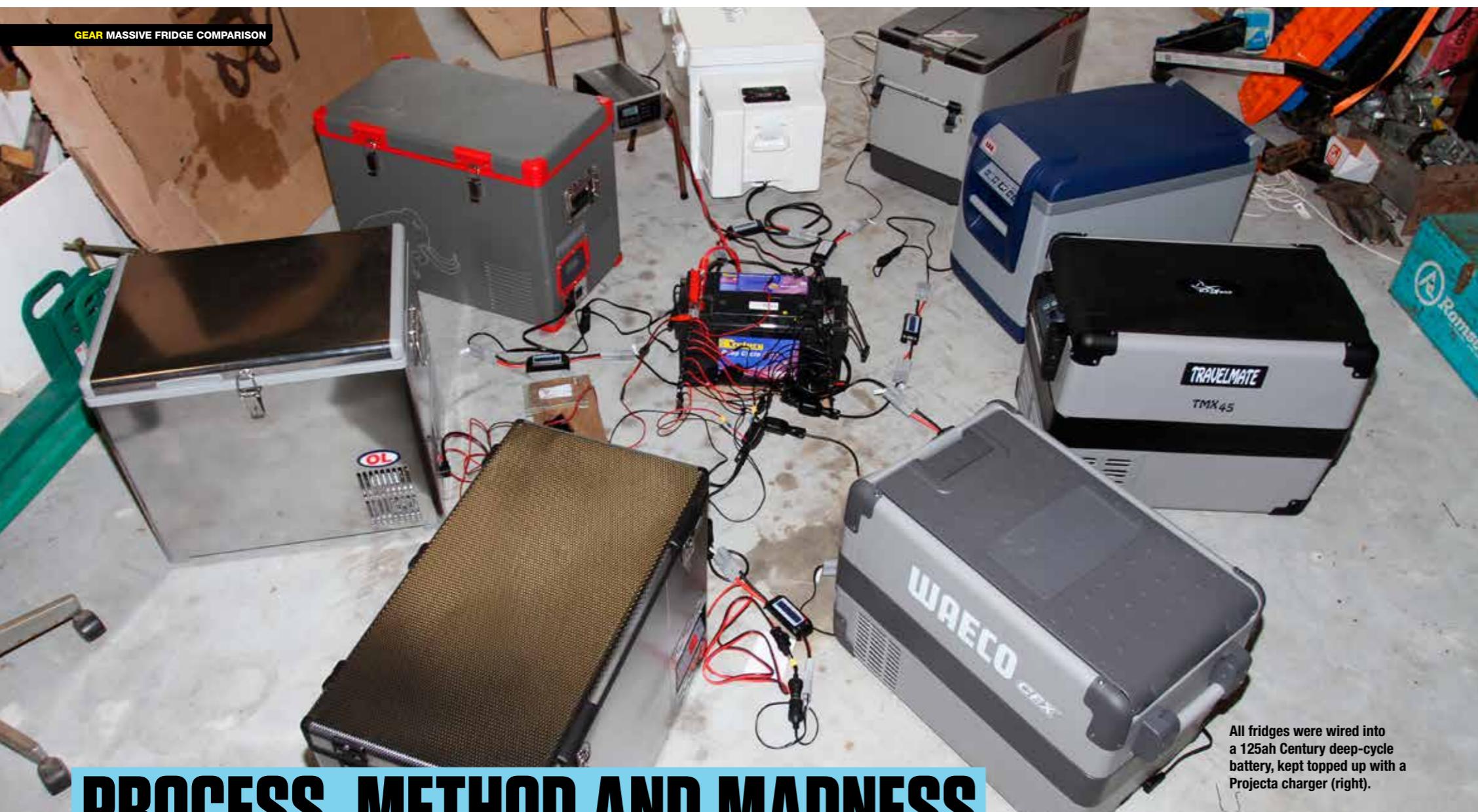
# STAY COOL

Eight fridges, thousands of high-tech recordings and a wild card to ruffle a few feathers – it's the ultimate fridge test.

**W**E'VE gathered eight of the most common 12-volt fridges on the market in an attempt to find out which one reigns supreme. We've also thrown in a wild card – a fridge purchased by the author back in 1990 – to see how advanced the latest and greatest

units really are. The 26-year-old Engel has kept things cool on a trip around Australia, served as a 'house' freezer in Darwin, and it has since been used (and somewhat abused) on countless long and short-term camping trips. Will our well-travelled and much-used Engel – complete with dents, rust and a dust-clogged compressor – be able to match it with the latest offerings? To add a bucket-load of validity to our

testing, we've sourced a few high-tech gadgets to prove a few impossible-to-guess qualities of each fridge. We've programmed temperature data recorders to store readings every 10 minutes, which can then be graphed and overlaid with all other fridges, as well as ambient temperature recordings. We also hooked up high-precision power analysers to keep track of power usage, so we can regurgitate average amp-hours used by each fridge.



All fridges were wired into a 125ah Century deep-cycle battery, kept topped up with a Projecta charger (right).

## PROCESS, METHOD AND MADNESS

WE wanted to replicate a real camping environment, but there are some things you can't control in the bush. So we opted to conduct the test in my non-NATA-accredited mancave, complete with heaters, lights and 240-volt power.

We didn't run the fridges on 240V; instead we used a 50-amp Projecta IC5000 7-stage Intelli-Charge battery charger set to constant power supply to keep a 125ah Century deep-cycle battery charged.

This 'power supply' mode administers a float charge to the battery, to ensure appropriate power levels are maintained when running appliances. Plus it doesn't run the risk of overcharging the battery.

The fridges were all wired into that one battery, so they all had a comparable 12-volt supply without the worry of the battery going flat.

We sourced a temperature data recording kit to record internal temps of each fridge every 10 minutes, plus we used an extra recorder to record ambient temperatures every 10 minutes.

Each fridge was packed with equal amounts of food and drinks: a loaf of bread, a two-litre orange juice bottle, eight cans of drink, four apples, four oranges, one packet of chocolate biscuits and a bag of salad leaves. The fridges were packed about two-thirds full to make the fridges work harder – given air temperature is harder to regulate than solid (food and liquid) temperatures.

**DAY ONE:** We packed the food and drinks into each fridge, which had been set at 3°C and had been running for two days prior to loading. The only exception was the old Engel, which has a simple numbered dial that was set at 2.5 (given my prior experience using it). Time would tell what temperature that setting would return.

**DAY TWO:** Each fridge remained closed day and night to monitor the effectiveness of the compressors and the accuracy of the temperature settings during a moderately warm day and cold night. This gave us

the opportunity to graph the cool-down periods and establish how stable each fridge would operate without overcooling or overwarming the contents.

**DAYS THREE AND FOUR:** At midday each fridge door was opened for five minutes. We then turned blow heaters on in the shed (not pointing at the fridges) to raise the ambient temperatures, as we wanted to have a go at replicating the heat-sapping temperatures of a scorching Aussie summer. That finalised 100 hours of run-time over four and a bit days.

To test the thermal insulation properties of each fridge at the end of day four, we turned all the fridges off, left all the food inside and left the lids closed to record how long each fridge would hold a decent temperature. This final test replicated a battery going flat and how long you have until food starts to perish.

**DAY FIVE:** After turning all fridges off we waited for 24 hours to retrieve the

temperature data recorders. To keep it all even, no lids were opened and no fridges were touched.

We did measure instantaneous current draw, but it's pretty much useless info so there was no point printing it. Some fridges draw a higher initial current than others, but cycle on for shorter periods of time compared to some with lower instant recordings that run for a longer period or cycle more often. Long-term power use is more important but is infinitely variable due to many factors. Again, all was even, so this gives you an ideal base line to compare all fridges.

When studying the graphs and collated data we concentrated on how well each fridge kept its internal cabinet temperature compared to the ambient temps, as well as how much power was consumed over the first 100 hours. That, combined with the final 24-hour power down – as well as the design, manufacturing finish and price – all led to our final decision.

### THE CONTENDERS

WE requested all suppliers provide (as close as possible to) 40 to 50-litre single-zone fridges. Why 40 to 50 litres? This volume fridge is one of the most popular sizes and is perfect for short camping trips. Larger capacity fridges are ideal for longer trips and larger families, but this compact size is a great starting point.

What's the go with the old Engel? That's my personal fridge; I purchased it in 1990 for \$1199. I needed a fridge for my two-year working holiday around Australia. On that trip it was wrapped in two-inch-thick foam with a pillow on top to help with insulation and, while that worked a treat, it also trapped moisture and caused a little surface rust to form. It then served as my freezer while I lived in Darwin – I

got to eat ice cream for the first time in two years! While I've looked after it the best I can, it hasn't been babied and it's copped a couple of dents, had the removable lid hinges twisted and straightened a couple of times, and even had a Two Zone clipped to the top for extra capacity.

You know what? Not a damn thing has gone wrong with that trusty old fridge and it has been the best camping product I have ever bought.

You know what else? Fridges cost about the same price now as they did 26 years ago and little has changed with their specs, other than a fancy electronic thermostat control, a compressor fan and an internal LED light. So we figured we'd chuck my old Engel into the mix to see how much fridges have improved, if at all.



Each fridge was loaded with these typical products.





Powder-coated metal carry handles sit below the latch.



Reversible basket caters for loads of all sizes.



The fridge will run on mains power by default.



Recessed temp controls are easy to use.



## ARB 47L



THE ARB fridge is a well-designed and thought-out fridge. The compact, rectangular-sized, powder-coated steel cabinet – with removable, end-opening, injection-moulded lid – is cleverly engineered with a spring-loaded detent system to easily detach and replace.

The over-centre, cam-lock lid latch is easy to operate single-handed and provides a good closing pressure to seal the lid. The lid's rubber hollow section seal is recessed to prevent damage, while a raised lip on the cabinet compresses into it to provide a good seal.

Just below the latch are solid, recessed, powder-coated metal carry handles that double as tie-down points. The mounted digital readout control panel is well

recessed to prevent knocking and can be easily set.

Inside, the cleverly designed basket is reversible to allow for different length loads, plus a separate dairy section is provided. The evaporator plate is integrated into the internal wall, as is the LED light.

A drain plug is fitted into the base between the mesh of the basket to allow for easy access. It seems ARB's engineers/designers took note of drink can dimensions, as the internal fridge dimensions – length and width – allow for a number of cans.

Clips in the rear external wall help secure 12-, 24- and 240-volt leads. The fridge will automatically select to run on

mains power whenever it is available (if both plugs are plugged in) but revert to battery power if the mains go off.

The latest crop of ARB fridges include a rear-mounted plug from which a remote wireless temp sensor can provide relevant fridge information to the driver.

### IMPROVEMENTS

IT COULD do with a basket for the dairy section, and the remote temperature monitor could be included as standard equipment. The evaporator plate could also extend to the top of the internal walls to help spread the cold more evenly. That's nit-picking, though, as it wouldn't make a huge difference to the fridge's operation.

### QUICK SPECS

FRIDGE SIZE TESTED other sizes available (in litres)

47 35 60 78

EXTERNAL DIMENSIONS (H x W x D) mm

508 x 380 x 705

ADJUSTABLE BATTERY PROTECTION

Yes

EXTERNAL CABINET / LID MATERIALS  
Powder-coated zinc steel walls with polypropylene trimming and injection-moulded lid

INTERNAL WALL MATERIALS

Metal / polypropylene

WEIGHT

22.5kg

COMPRESSOR TYPE

SECOP BD35

POWER SUPPLY

12V, 24V DC and 240V AC

WARRANTY

Three years

FURTHER INFORMATION

[www.arb.com.au](http://www.arb.com.au)

RRP

\$1249



Turning dial doesn't indicate exact temps.



Internal evaporator semi-protected from wire basket.



After 26 years, it's still in pretty good nick.



Sufficient ventilation around the compressor.



## ENGEL 40L



THE Engel fridge is the only fridge to use the Sawafuji Swing Motor. It operates totally differently to the more commonly used Danfoss/Secop unit, in that it has fewer moving parts and therefore less that could potentially go wrong. Given the longevity of the Engel brand, as well as this 26-year-old test unit, who are we to argue the point?

The internal (separate from the wall) evaporator is semi-protected from the wire basket, but should still be treated with care. Mine certainly has plenty of rub marks but has never been damaged beyond use. Being a separate plate aids in cold air circulation, leading to potentially lower power consumption.

The steel casing provides a rugged

cabinet and lid, plus the steel handles double as tie-down points – although separate tie-downs can be attached.

With this older example the dial isn't set to a temperature, rather just a number from one to five. You are left to guesstimate temperatures via use and adjustment. The latest versions do have an electronic temperature setting system similar to most others.

The newer Engel lids have fixed hinges that prevent them from accidentally coming off, but I like being able to slot mine off, even if I've had to straighten the prongs a few times with pliers.

Auto switching is standard between 12-, 24- and 240-volt, which removes the need to switch power sources manually –

provided that both leads are plugged in.

The Engel has the best ventilation around the compressor (top, rear and both sides). A semi-recessed seal is attached to the lid and a single over-centre latch compresses it well when closed.

### IMPROVEMENTS

TAKING into account the updates of the latest-model Engel, increased cabinet and lid insulation wouldn't hurt. Given the higher cycling (compared to all others) of the compressor, I'd wonder if that better insulation would reduce the cycles and aid in the already excellent (low) overall power consumption. Other than that it's an excellent and simple fridge that should last ... well, at least 26 years.

### QUICK SPECS

FRIDGE SIZE TESTED other sizes available (in litres)

40 32 57 60 75 80

EXTERNAL DIMENSIONS (H x W x D) mm

508 x 364 x 648

ADJUSTABLE BATTERY PROTECTION

No

EXTERNAL CABINET / LID MATERIALS

Powder-coated steel walls and lid

INTERNAL WALL MATERIALS

Powder-coated metal evaporator

WEIGHT

24kg

COMPRESSOR TYPE

Sawafuji Swing Motor

POWER SUPPLY

12V, 24V DC and 240V AC

WARRANTY

Three years

FURTHER INFORMATION

[www.engelaustralia.com.au](http://www.engelaustralia.com.au)

RRP

\$1375



Circuit breaker switch is a clever safety measure.



Twin removable baskets let you get snacks in a hurry.



Digital display is a recent addition to Evakool's range.



One of two lid straps used to keep the lid firmly shut.



## EVAKOOL 47L



EVAKOOL has adapted its thermally brilliant high-gloss fibreglass ice box by attaching a Danfoss compressor. It's proven to use minimal power and it now incorporates digital electronic display. Quality insulation means it should use little power in high ambient temps.

The design of the lid, which incorporates two hard nodules under the rubber seal, prevents over-compressing of that seal but the rubber may become worn over time. Twin elastic lid straps are used to maintain firm pressure on the lid when closed, but they are a little fiddly.

This Evakool is a fridge/freezer, but we removed the dividing wall to use it only as a fridge. It's the only fridge on test that can double as a combination fridge and freezer.

The external cowl housing the compressor has an internal fan to blow compressor-generated heat out, which also keeps heat away from the cooler section.

A 240-volt adaptor (included) is needed to run from mains power, while a marinating option is available. High, medium and low compressor speeds can be selected.

Twin removable wire baskets make for easy loading/unloading, and the removable wall makes for great alternate uses as a fridge/freezer. The screw-on 12-volt plug is the best in the business and can't accidentally be knocked off like many others. A circuit breaker is mounted to the side wall.

A bung in the side wall empties spilt liquids, while the smooth internal finish aids in easy cleaning – except around where

the separate evaporator panel is fitted.

That plate being separate from the wall allows for increased air circulation, as does the pair of baskets that hold the contents just off the base. On the downside, tall juice bottles don't have enough clearance to stand upright. However, the outer lid could still close.

### IMPROVEMENTS

HAVING returned excellent power consumption results, it's hard to go past the thermal insulation properties of this fridge. However, improving the lid seal with an open air-pocket rubber (as per many others) and eliminating the nodules under the seal would be worth considering. Other than that, there's nothing to change.

### QUICK SPECS

FRIDGE SIZE TESTED other sizes available (in litres)

47 40 60 85 110 150

EXTERNAL DIMENSIONS (H x W x D) mm

430 x 445 x 725

ADJUSTABLE BATTERY PROTECTION

No

EXTERNAL CABINET / LID MATERIALS

Fibreglass

INTERNAL WALL MATERIALS

Fibreglass

WEIGHT

22kg

COMPRESSOR TYPE

SECOP BD35

POWER SUPPLY

12V and 24V, with separate 240V adaptor

WARRANTY

Five years

FURTHER INFORMATION

[www.evakool.com](http://www.evakool.com)

RRP

\$1199



Three ABS plastic baskets maximise storage space.



Separate baskets makes for easy content retrieval.



Digital panel features a turbo button to up the ante.



## QUICK SPECS

FRIDGE SIZE TESTED other sizes available (in litres)

52	40	50	55	60	65
72	80	90	110	125	

EXTERNAL DIMENSIONS (H x W x D) mm

506 x 710 x 385

ADJUSTABLE BATTERY PROTECTION

Yes

EXTERNAL CABINET / LID MATERIALS

Stainless steel

INTERNAL WALL MATERIALS

Stainless steel

WEIGHT

26kg

COMPRESSOR TYPE

SECOP BD35

POWER SUPPLY

12V, 24V DC and 240V AC

WARRANTY

Three years

FURTHER INFORMATION

[www.nationalluna.com.au](http://www.nationalluna.com.au)

RRP

\$1845

# NATIONAL LUNA 52L



GIVEN the National Luna 40-litre fridge is due for a revamp we opted for the newly released 52-litre stainless steel version.

With a 60mm-thick wall, high-density insulation and complete coverage of integrated internal wall cooling plates, it should use minimal power and show consistent temps in all parts of the fridge.

The smooth mirror-finished internal walls are easily cleaned, while there is no protruding evaporator plate to damage. Three black ABS plastic baskets are fitted: two stacked on one side and a smaller unit for the dairy section.

12/24-volt DC and 240-volt AC are all built-in. The unit will automatically select to run on mains power whenever it is available (if both plugs are plugged in) but

it will revert to battery power if the mains go off. The controls also detect battery voltage: when the battery is charging (via the engine) the compressor will run at high speed for maximum performance, but it will revert to Battery Save mode when the engine or charger is off – Turbo mode can be used to over-ride this function.

The side-mounted digital thermostat is easily set and provides info on battery voltage, lid alarm, battery protection levels and fault-code LEDs. It also features a turbo button to over-ride the automatic compressor speed to increase cooling, as well as an LED temp control and readout.

The wide rubber seals attached to the lid are similar to residential fridges, with an air pocket to keep cool air in and hot

air out. Triple hinges hold the lid open in lieu of a cable stay. The dual over-centre, lockable stainless-steel catches compress the rubber to ensure an airtight seal, while stainless-steel, spring-loaded, fold-flat handles double as tie-down points.

This is the only fridge supplied as standard with a proper Merit plug for use with 12/24-volt power.

## IMPROVEMENTS

THE triple baskets can be separated, but they don't permit tall bottles to stand upright. A flip-up base of the upper basket would be more practical, but that all depends on what you're trying to pack in. The price is high comparatively, but you're getting a top-of-the-range unit.



An external lid cord stops the lid from over-opening.



12-, 24- and 240-volt power inlets provided.

## QUICK SPECS

FRIDGE SIZE TESTED other sizes available (in litres)

40 72

EXTERNAL DIMENSIONS (H x W x D) mm

525 x 600 x 420

ADJUSTABLE BATTERY PROTECTION

Yes

EXTERNAL CABINET / LID MATERIALS

Stainless steel

INTERNAL WALL MATERIALS

Aluminium

WEIGHT

22kg

COMPRESSOR TYPE

Snomaster

POWER SUPPLY

12V, 24V, 240V

WARRANTY

Two years

FURTHER INFORMATION

[www.oppositelock.com.au](http://www.oppositelock.com.au)

RRP

\$1249 (includes remote monitor and travel cover)



Flush-mounted control and read-out panel.



Single lockable latch keeps the lid sealed shut.



# OPPOSITE LOCK 40L



THIS newly released fridge from Opposite Lock is a stainless-steel unit designed in South Africa. It has a plethora of high-quality inclusions, all at a modest price. There are only two sizes at present (40- and 72-litre) and we were the first to be given a sample 40-litre unit.

The compressor is a 66-watt Snomaster unit (not a SECOP/Danfoss), while the fridge electronics incorporate adjustable low battery protection and 12-, 24- and 240-volt power inlets. It has a 60mm-thick wall filled with high-density, high-pressure-injected polyurethane insulation.

Inside is a rippled aluminium inner wall with incorporated evaporator; an internal LED light and three separate baskets – two stacked and one for the dairy section. The

inner wall lining is easily dented if you drop a heavy, hard-edged item onto it.

It's supplied with a wireless temp and battery monitor readout, which plugs into the cigarette power outlet. A padded polycotton – with silver reflective inner lining – transit bag is a great inclusion given the overall price. We didn't receive the bag, though, as we were early receiving the yet-to-be released sample fridge.

A single lockable latch compresses the lid seal, which is a wide, multi-stage rubber that presses against a wide, smooth cabinet lip. Two spring-loaded, fold-flat carry handles double as tie-downs, and an external lid cord stops the lid from over-opening on its two stainless-steel hinges.

The flush-mounted control/display panel

incorporates temp controls, compressor speed control, battery monitor display and a mode button. The aforementioned wireless display simulates the main fridge display with temp and battery monitor info.

Like all stainless-steel fridges, expect fingerprints to show up – although the protective bag will hide this.

## IMPROVEMENTS

IT MAY not be necessary given how sturdy the lid appears, but I'd like to see two lid latches to evenly compress the lid on its rubber seal. The stackable baskets prevent tall bottles from standing upright; a trap door in the upper basket would fix this. Other than that, this newly released fridge might take the market by storm.



Dual plastic lid straps stop the lid from over-opening.



Unloading goods is easy using the twin baskets.



AC power, DC power and a replaceable fuse.



Easy-to-read flush-mounted control panel.

## QUICK SPECS

FRIDGE SIZE TESTED other sizes available (in litres)

45 60 74 100 130

plus flexi-zone models

37 65 92 118

EXTERNAL DIMENSIONS (H x W x D) mm

477 x 659 x 374

ADJUSTABLE BATTERY PROTECTION

Yes

EXTERNAL CABINET / LID MATERIALS

Metal

INTERNAL WALL MATERIALS

Aluminium

WEIGHT

22kg

COMPRESSOR TYPE

SECOP BD35

POWER SUPPLY

12V, 24V DC and 240V AC

WARRANTY

Three years

FURTHER INFORMATION

[www.companionbrands.com.au](http://www.companionbrands.com.au)

RRP

\$1199

# PRIMUS MAMMOTH 45L

THE Mammoth range of Primus fridges offers steel cabinets and lids, with rippled aluminium walls and integrated evaporators. The interior finish can be dented with the drop of a hard-ridged can, but use of the basket should prevent this.

Sturdy spring-loaded, fold-flat handles also double as tie-down points. Wide dual-stage rubber seals with an air gap compress against the wide, smooth cabinet-top edge to ensure a good quality seal. And, given the positive clamping pressure of the dual over-centre latches, it should keep the cold in.

Twin baskets (main fridge and dairy) make for easy loading and unloading of food and drinks, plus there's an internal LED light. Surprisingly, the internal

temperature sensor is 'open' to the cabinet contents. Whether moisture or spilt food and liquids can make their way in isn't known, but it's worth noting. Dual plastic lid straps avoid over-opening of the lid, and once unclipped they let you remove the lid altogether from the double hinges.

The flush-mounted control panel allows for easy temp setting, variable three-stage battery protection, and ECO and MAX compressor settings. It is one of the easiest to read given its large green-coloured digits. An external replaceable fuse has been fitted, as have 12-, 24- and 240-volt power supplies via the two cords.

## IMPROVEMENTS

A STURDIER system to hold the lid straps

in place would help. They didn't break, but flexed a bit when pulled on. The jury is out with the small open vent inside the fridge cabinet that houses the temp sensor.





Control panel features USB port to charge accessories.



End-hinged lid can be easily removed.



Two inputs, for 12-/24- and 240-volt power leads.



## QUICK SPECS

FRIDGE SIZE TESTED other sizes available (in litres)

45 38 50 65 80

EXTERNAL DIMENSIONS (H x W x D) mm

491 x 680 x 410

ADJUSTABLE BATTERY PROTECTION

Three-stage

EXTERNAL CABINET / LID MATERIALS

Polypropylene

INTERNAL WALL MATERIALS

Polypropylene

WEIGHT

18kg

COMPRESSOR TYPE

SECOP BD35

POWER SUPPLY

12V, 24V, 240V

WARRANTY

Five years

FURTHER INFORMATION

[www.evakool.com](http://www.evakool.com)

RRP

\$1169 (includes travel cover)

# TRAVELMATE TMX 45L



THE Travelmate series of fridges from Evakool incorporates a polypropylene cabinet and a very user-friendly multi-use lid that can hinge from either end and can be easily removed. It's worth noting that some fridges in this line-up hinge from the sides rather than the ends.

Inside is an LED light, a bung in the base and a single basket with a vertical divider that's easily lifted out for accessing contents. However, the test basket had an uneven base and was the incorrect size. This meant it moved in the cabinet and, over time, it could damage the inner wall, which incorporates the evaporator.

The handles are an excellent design, as they fold up and down. They also incorporate magnets to prevent them from

rattling in transit, but, if you're in transit, you'd be using them as tie downs, so they wouldn't rattle anyway.

The fridge features 12-, 24- and 240-volt power via two power leads, three-stage battery protection on the digital LED compressor control panel, and a USB outlet to power suitable accessories.

There's also an emergency over-ride system should something go wrong with the standard electrical power system.

Included with each fridge in the range is a transit cover to help with protection and insulation.

## IMPROVEMENTS

THE food basket fitting rocks (due to a non-flat base) and moves back and forth

(not a tight fit), which will eventually damage the internal walls and the evaporator plate. Other than that, it's a well-designed fridge with the best multi-use lid on the market.





Easy-to-use flush-mounted controls.



The lid can be easily and quickly removed.



Removable lid's recessed seal is safe from damage.



AC and DC inputs provide multiple power options.



## QUICK SPECS

FRIDGE SIZE TESTED other sizes available (in litres)

40 28 35 50 65 95

EXTERNAL DIMENSIONS (H x W x D) mm  
461 x 398 x 630

ADJUSTABLE BATTERY PROTECTION  
Yes

EXTERNAL CABINET / LID MATERIALS  
Polypropylene

INTERNAL WALL MATERIALS  
Metal / polypropylene

WEIGHT  
18.5kg

COMPRESSOR TYPE  
Waeco

POWER SUPPLY  
12V, 24V DC and 240V AC

WARRANTY  
Five years (compressor), three years (whole unit)

FURTHER INFORMATION  
[www.waeco.com.au](http://www.waeco.com.au)

RRP  
\$1249

# WAECO CFX 40L



THE Waeco CFX features a Waeco compressor with VMSO (variable motor speed optimisation), meaning the compressor speed will vary depending on the load (amount of cooling) required. The fridge also features selectable low voltage battery protection and a 'soft start' to help lessen the initial electrical load.

The flush-mounted controls are easy to use and the sturdy, powder-coated handles can fold flat and double as tie-down points. There's a USB port to plug in other devices for charging. 12-, 24- and 240-volt leads are supplied as standard, allowing the Waeco to run on all power supplies.

The easy-to-open removable lid has a

recessed rubber seal to prevent damage, while a raised lip on the cabinet compresses into it to provide a good seal. The external polypropylene walls and lid keep the fridge looking good regardless of the tiny scraps and scratches it may get over time.

Internally, the evaporator plates are flush-mounted, and the basket has a vertical divider and a separate dairy section. There's also a bung in the base of the fridge to empty spilt liquids and an LED light in the end wall.

## IMPROVEMENTS

IT NEEDS a lift-out basket for the dairy section, and the evaporator plate could extend to the top of the internal walls to

spread the cold more evenly. The latter is a minor point and may not make much real-world difference to the cooling performance.





## COOL RUNNINGS

### WHAT TO LOOK FOR

ACCURATE and useable fridge controls are important for setting and maintaining a temperature, but most temperature readouts on these fridges are not calibrated, so they are not 100 per cent accurate. We found this to be true, with temp readout variations from -1°C to 7°C, even though all fridges were set at 3°C – clearly, what the digital readouts are telling us is not what the actual temps are inside the fridge.

Instant power use means little. Instead, it's how a fridge keeps its contents within a set temperature range that matters. Power usage is variable and depends on ambient temperatures, humidity, the amount of

food in the fridge and the regularity of lid openings. We may all want to use as little power as possible, but my bet is that most people would be willing to sacrifice a little extra power usage knowing that their fridge will do the job long term.

Other than a good power supply and correct wiring, the most important thing to keep any fridge running effectively is ventilation around the compressor. There should be ventilation on the sides and top of the compressor, as well as a fan to expel the hot air the compressor creates.

Watch out for condensation (or excessive coolness) in small sections of the fridge's exterior. This proves a lack of thermal

insulation qualities, which equates to a loss of cooling effectiveness and leads to excessive power consumption.

Look at the position of the evaporator plate in the cabinet – the higher it goes in the cabinet (a gap between the plate and the base of the fridge is okay) the better the all-round cooling will be.

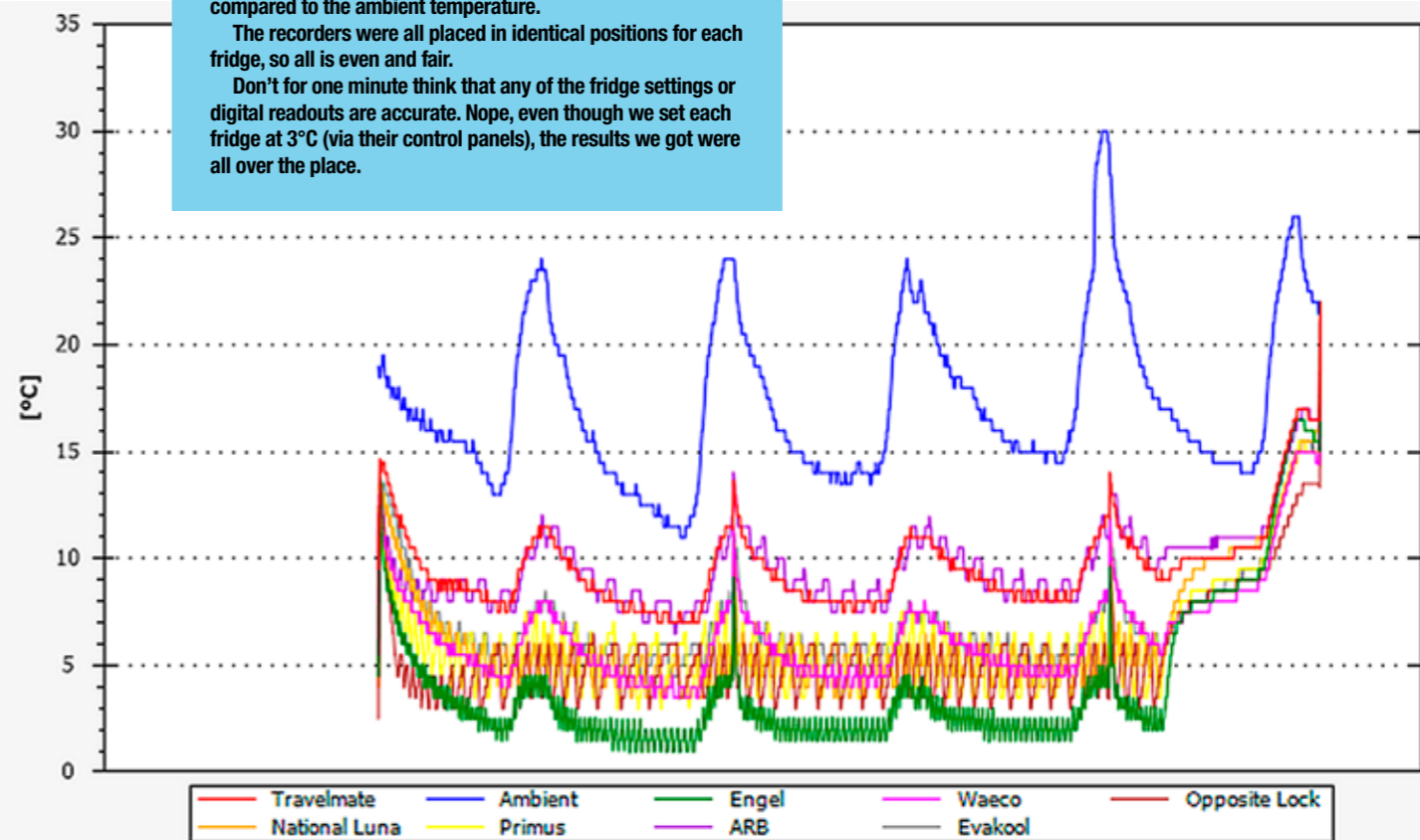
A separate evaporator plate (in the fridge cabinet) should work better than an integrated one, as both sides of the plate can supply cool air to the inside of the fridge. A slight convection current around the plate can also help circulate cold air, but that separate evaporator allows liquid, food and dirt to build up behind it. A

### STATS THAT MATTER

THIS graph shows the temp readouts of each fridge when compared to the ambient temperature.

The recorders were all placed in identical positions for each fridge, so all is even and fair.

Don't for one minute think that any of the fridge settings or digital readouts are accurate. Nope, even though we set each fridge at 3°C (via their control panels), the results we got were all over the place.



separate evaporator can also be damaged more easily than an integrated one.

Other key areas to look at include the lid seal; good insulation to help reduce compressor run-time; tie-down points; low battery voltage protection; and power options (12-, 24- and 240-volt). Fridge covers may have minimal thermal advantages, but they are a good option for protecting a fridge's exterior and for keeping direct sunlight off the unit. Covers are more useful on metal fridges compared to plastic and fibreglass units.

### COMPRESSORS

DANFOSS was a German-designed and

manufactured hermetic-piston-type compressor, which arrived in 1977. It has since been copied, duplicated and counterfeited by various countries and organisations around the world.

These days the German Danfoss brand is no more – it was acquired and its name changed to SECOP in 2010. It's still the same (or similar) unit with the same (or similar) models (BD35 for smaller and mid-range fridges; BD50 for the larger ones) with company headquarters in Germany, albeit with manufacturing in Austria, Slovakia and China. In 1998 the variable-speed compressor was created, whereby the electronics of the fridge manufacturer

could control the compressor speed to aid in lower power consumption.

While most of the fridges on test have a SECOP BD35 compressor, the Engel has a Sawafuji unit, the WAECO fridge utilises a WAECO-branded compressor and the Opposite Lock fridge has gone with the Snomaster compressor.

The Snomaster compressor is used in both of Opposite Lock's fridge sizes (40 and 72 litres) in Australia. It was designed to return faster pull-down temperatures via its higher power, as well as short cycle times in combination with good thermal cabinets. Our testing confirmed this compressor is the standout.

## TIPS AND TRICKS >

**1** THE correct power supply is paramount. To minimise voltage drop from your battery to the fridge, use the largest diameter and shortest length cable available. A common reason why fridges often don't work is because they are plugged into the vehicle's cigarette plug in the rear cargo area – too thin and too long wires aren't good enough. To give your fridge the best chance of working correctly run dedicated wiring from your (auxiliary) battery.

**2** VENTILATION for your fridge is important. The higher the temperature in your vehicle or camper trailer the harder the compressor has to work and the more battery power it'll use. If safe, leave windows down (if the fridge is in your vehicle) or the fridge box open (if in a camper trailer) to allow the heat to escape. Don't pack other camping gear on or too close to the vents of the fridge.

**3** ENSURE the lid seals are working as they should. To do this, put your torch (turned on) inside the fridge and close the lid. If the seal is not sealing, you'll see light coming out. This method works best at night. You can also close the fridge lid onto a piece of paper and try to slide the paper around the seal. If the paper slides, your seals are stuffed or the latches are not compressing the seals adequately.

**4** ONLY put non-cold items in the fridge before driving. This will reduce the amount of pure battery power used (or wasted), as the fridge will be running at its maximum to reduce the new food or drink's temperatures while the batteries are being charged via the vehicle's alternator. Where possible, use 240V power to bring the fridge temp down before filling it or heading off on your trip.

**5** CONSIDER the benefits of thermal mass. Keeping your fridge as full as possible helps reduce the run time of the compressor. The higher the mass, the longer the cold will hang about within that mass without having to re-cool it by running the compressor. Smaller amounts of cold food will lose their temperature faster than larger amounts of food.

**6** WHILE keeping your fridge as full as possible is good, also consider cold air circulation. Internal baskets help avoid over-stacking of food, while a separate evaporator plate (as compared to an integrated one) allows superior air circulation, as there is a gap between the plate and the walls.

**7** MINIMISE opening and closing the fridge lid. Cold air may fall – and all these fridges have top-opening lids – but the less you allow cold air to (potentially) escape and hot air to intrude, the less your compressor needs to run.

**8** THE jury is out on fridge covers. If fitted correctly an insulating fridge cover can keep a fridge cooler by obstructing direct sunlight and heat, but if the heat is allowed to build up, the cover could also keep the heat in. So make sure it's fitted correctly.

## POWER USAGE

COMPARING all fridges at the same time with the same power supply and the same contents serves as a great base to show how the fridges compare against each other. That being said, there will be differences in power consumption and internal fridge temperatures depending on where you mount and where you use each of these fridges – such as crammed into the back of your 4x4 with a heap of other gear stuffed around it.



# RESULTS

AFTER 124 hours – 100 hours with the power on to test power consumption and temperature recordings every 10 minutes; and 24 hours with the power off to test each fridges' insulation qualities – the results are in. We had no fridge failures, no food was spoiled, and all the contents were kept cold.

However, over 26 years (probably more, given this type of fridge has been around longer than my personal example) there doesn't seem to have been huge improvements in the workings of the fridges. Sure, there are gimmicky add-ons – electronic thermostat readings to make setting the fridge temps easier, and fancy hinge and locking systems. Some also have improved insulation compared to my thinner-walled unit. But, at the end of the day, they still chew (roughly) the same amount of battery power.

All the fridges except my 1990 Engel feature a variable speed compressor, which helps to alleviate power consumption. However, that all depends on the ambient temps, fridge contents and general loads on the fridge as to how much better they will be. Perhaps I'm asking too much, but given a quarter of a century has passed I figured some clever engineer could have come up with a vastly improved compressor and electronics system for superior

temperature regulation and battery conservation.

So, which fridge is best? At the end of the day you can't go wrong with any of the fridges we have on test. However, the winner of this comparison is the newly released Opposite Lock 40-litre fridge.

The Opposite Lock stainless-steel unit was the outright winner at maintaining internal temperatures while daytime temps peaked. It also maintained the lowest cabinet temps for the longest period, but only by a couple of degrees for a couple of hours. Sure, you still end up with warm contents, but that little test proved how damn good the thermal insulation is – even better than the highly acclaimed Evakool fibreglass box. And we didn't even have access to the normally included travel cover.

The Opposite Lock Snomaster compressor pulled cabinet temps down faster than all the others, so it's safe to assume it initially uses more power. However, it then plateaus as cycles are controlled both by the electronics and the quality insulation.

The only major downside of the Opposite Lock fridge is the limited range; at the time of testing there were only 40- and 72-litre sizes. The small stacking baskets also create an issue, as tall bottles can't stand upright. However,

they do make it easier to access the contents below by allowing you to easily lift out the top basket.

The \$1249 asking price is about average compared to all the others on test – except the National Luna at \$1845 – and with that you get a remote temp/battery monitor and a travel cover.

The best advice is to study the graphs, drool over the comparative specs, photos and prices, and understand the pros and cons we've noted. Then buy the fridge that suits you best and get out 4x4ing and camping.

Regardless of which fridge you purchase, you will have to fine-tune the temperature settings to ensure the longevity of your food and drinks. As for how long each fridge will last on your battery, that's your job to keep the battery suitably powered. Sure, some fridges may last a little longer by using less power, but once you've been out for a few days, all batteries will need topping up.

What about my old Engel? It didn't hold the same thermal efficiency within the cabinet compared to some, but it kept up with all others on test. Let's just hope the Opposite Lock fridge can be still churning out the quality coldness in a quarter of a century – then perhaps, it can lay claim to legendary status. 