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February 2022

A man with a mustache, wearing a blue t-shirt and a dark cap, is working on a yellow cable on the side of a white RV. He is looking up at the cable, which is coiled and runs along the side of the vehicle. The background is a clear blue sky with some clouds.

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NORTH AMERICA'S PREMIER HOW-TO RV RESOURCE

February 2022

Volume 2, Number 2

INSIDE



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News & Notes

The move to electric vehicles continued at the Consumer Electronics Show, where Chevrolet showcased its Silverado EV. Closer to home, Keystone RV debuted its "My Keystone" mobile app and RV shipments continued setting records in 2022. Meanwhile, Lippert introduced a new chassis protection finish and Spartan RV Chassis revealed its "No Jacks" leveling system.



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New Brands, Models and Floorplans for 2022

The RV industry is in a near-constant state of change — and this new monthly column features the latest towable and motorized units for the 2022 model year. Up first: new looks from Airstream, Forest River Flagstaff and Cherokee, DRV Suites, Venture RV, Renegade RV, Aliner and Midwest Automotive Designs.



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Cutting the Cord

Whether it's because you just want to get away from it all or you can't find a last-minute campsite, boondocking is fueling much of RVing's rise in popularity. *RV Enthusiast* spoke with top installers and suppliers to discover what new products are available — and what kind of systems you really need to live off the grid.



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Stopping on a Dime

Towing heavy fifth wheels and travel trailers requires a lot of engine "grunt" — but stopping performance is even more important for a safe journey. Electric drum brakes help substantially, but they have their limitations. Converting to disc brakes provides more equal braking at each corner and better overall performance.

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The campground industry is playing "catch up" in a big way, with thousands of new sites being planned for. But it's gonna take time.



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RV Enthusiast Technical Director Bill Gehr removes the rope light from the strip rail of an awning during installation of a new porch/patio light on a fifth wheel. Photo by Bob Livingston..

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Step Lively

RV entry steps — whether on a towable or motorized RV — take a beating on a daily basis. Making sure they are in good working order and provide solid footing is paramount. Annual inspections should identify lubrication points and address abnormal wear — and worn grip tape needs to be removed and replaced.



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Illuminating the entry into an RV isn't hard to do — but the awning strip lights employed by many manufacturers have their drawbacks. Adding an LED fixture is an easy upgrade — and provides substantially more coverage to not only the entry steps but the entire patio area outside your RV.



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Turning the Corner on Water Leaks

When RVs travel down the road, they flex and twist. Not surprisingly, this movement can, after years of use, also create incursion points for water. The corners of an RV are especially susceptible to this flexing. While a short-term “fix” might be to add more sealant, it doesn't solve the problem. Here's how to repair corner leaks the right way.



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A Sanitary Solution

Replacing and maintaining the valve seal in a toilet isn't the most desirable chore — but let it go too long and you'll find yourself with a nasty problem. The lack of water in the bowl can lead to obnoxious odors in the small confines of an RV. Replacing the seal in popular Dometic 310 or 320 toilets isn't hard. Just get over the “icky” factor.

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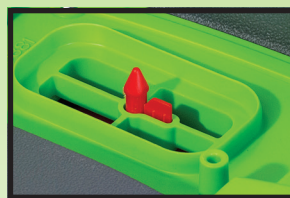
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THETFORD

The Campground Industry is Playing 'Catch-Up' in a Big Way — but it's Going to Take Time

By Bruce Hampson

It's easy to find fault with a product, a service or a company for a perceived drawback. Among RVers, that often centers upon the quality — or sometimes the lack thereof — of their rigs. For example, owners seem to have a hard time when comparing the reliability of an RV and its myriad related componentry — built by hand — to their robot-constructed automobiles that have none of those systems on board. Show me a car or truck that came off the line with a full raft of kitchen appliances, a fully functioning bathroom, a bedroom, a dinette and multiple rooftop air-conditioners and I'll show you a vehicle that's probably not going to live through its warranty without visiting the dealership's service bays.

To be sure, the industry's growing pains have no doubt resulted in some units squeezing through the process that shouldn't have. But at the risk of sounding like a cheerleader, the overall picture is one of an industry doing its utmost to equip North America's outdoor enthusiasts with a safe and comfortable home when enjoying nature.

Sometimes, though, that means setting up camp in a primitive location because the RV park an owner wanted to stay at was booked...through the following year. Yes, the exploding popularity of camping — fueled by the pandemic — caught the outdoor hospitality arena by surprise, just as it did the rest of us. And, yes, campsites at popular destinations can be hard to come by. But I was surprised to learn just how hard the outdoor hospitality industry is working to make up for this shortfall.

As reported recently in *Woodall's Campground Magazine* (WCM) — sister publication to *RVBusiness* — there are quite literally thousands of new campsites in the works. "I've never had more parks in the planning stage in my entire career," Jayne Cohen of Campground Consulting Group LLC told *Woodall's*. "And these are big parks, not little parks. Many of the ones I am working on are 100 to 300 acres, with a minimum of 250 sites — one park is 1,000 sites."

According to WCM, based upon its staff's contacts with park owners and developers, at least 15,200 new RV sites will have come online or will be added between 2021 and 2023. Of more interest, WCM has documented plans for at least 53 new campgrounds, 30 of which have already been announced. Add to that, the publication reported that Kampgrounds of America (KOA) anticipates building another 23 campgrounds in 14 states and two Canadian provinces — and will be adding 3,900 additional sites to its existing inventory of franchise parks.

Among the parks that have either recently opened for business or are expected to by the end of 2023:

- Alabama:** *Gulf Shores RV Resort, Gulf Shores:* 500 sites.
- Arizona:** *River Sands RV Resort, Ehrenberg:* 275 sites. *Village Camp Flagstaff:* 76 RV sites.
- California:** *Coachella Lakes RV Resort, Coachella:* 375 sites. *Flying Flags Avila Beach, Port San Luis:* 55 RV sites.
- Florida:** *Cabana Club RV Resort, Auburndale:* 280 RV sites. *Champions Run RV Resort, Ocala:* 492 sites. *Fort Pierce West KOA Holiday, Fort Pierce:* 117 sites. *Island Oaks RV Resort, Glen St. Mary:* 385 sites. *Oxford Springs RV Resort, Ocala:* 166 sites. *Oxford Villages RV Park, Ocala Springs:* 275 sites. *Palm Breeze RV Resort, Punta Gorda:* 205 RV sites. *Santa Fe Palms RV Resort, Gainesville:* 115 sites. *Southern Sands RV Resort near Punta Gorda:* 189

sites. *Splash RV Resort and Water Park, East Milton:* 351 RV sites. *Sun Outdoors Islamorada, Islamorada:* 82 RV sites. *The Surf RV Resort, Palmetto:* 449 sites. *Tranquility Lake RV Resort, Cape Coral:* 144 sites.

•**Ohio:** *RVC Outdoors, Sandusky:* 215 sites.

•**South Carolina:** *Savannah Lake RV Resort, Hardeeville:* 375 sites.

•**Tennessee:** *Cherokee Outdoor Resort and Marina near Vonore:* 238 sites. *Campground on Watts Bar Lake, London:* 189 sites.

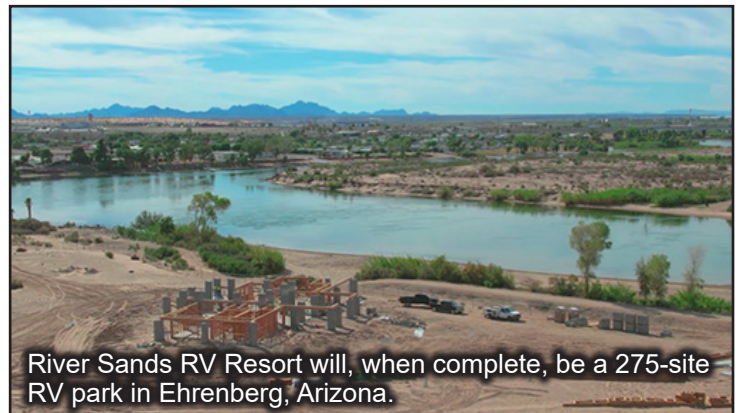
•**Texas:** *Soggy Dollar Camp, New Braunfels:* 40 RV sites. *Camp Fimfo, New Braunfels:* 200 sites. *Great Escapes RV Resort, Elgin:* 208 sites. *Great Escapes RV Resort, Bryan College Station:* 304 RV sites. *Great Escapes RV Park, Austin Oaks:* 387 RV sites. *Great Escapes San Antonio:* 241 sites. *The Retreat RV & Camping Resort on Lake Houston:* 264 sites.

This list — as impressive as it is — doesn't even address the dozens of existing campgrounds that have (or will be) substantially expanded.

These projects are all the more impressive when you stop to consider the effort required. This isn't akin to a potential RVer writing a five- or six-figure check for a new fifth wheel — building a campground often costs millions of dollars and can take years to wade through the local and regional permit process and its development restrictions. "You have to clear the entitlement hurdles for water, sewer and power," campground consultant Ron Beard said, adding, "a lot of states don't have zoning in place, so they are limiting development by making septic rules tougher to clear." Many of these new parks are also being built with cutting-edge amenities, which further drives costs.

Beyond that, the push for more parks has created the same sort of problems RVers needing repairs to their rig can empathize with. Suppliers to that industry, such as manufacturers of electrical pedestals, are fighting their own supply-chain issues to provide campgrounds with the necessary infrastructure components.

Obviously, it's going to take years for the balance between supply and demand to find some sort of equilibrium — the balancing point where there are enough sites, yet campgrounds can continue to make money even during times when many sites will go unoccupied — but it's coming. Watch for it. Until then, online sites such as Roadpass Digital's *Campendium* (roadpass.com) and Harvest Hosts (harvesthosts.com) will help to bridge the gap with some truly unique boondocking locations. **RVE**



River Sands RV Resort will, when complete, be a 275-site RV park in Ehrenberg, Arizona.



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Chevy Silverado Going Electric



In the December 2021 issue of *RV Enthusiast*, we provided an overview of the hottest new trucks for 2022 — including a look at EVs (electric vehicles) from Ford (Lightning), Tesla (Cy-

bertruck), Rivian (R1T pickup and R1S SUV) and GMC (Hummer EV). One nameplate conspicuously absent from our electric vehicle rundown was Chevrolet — but it appears that is about

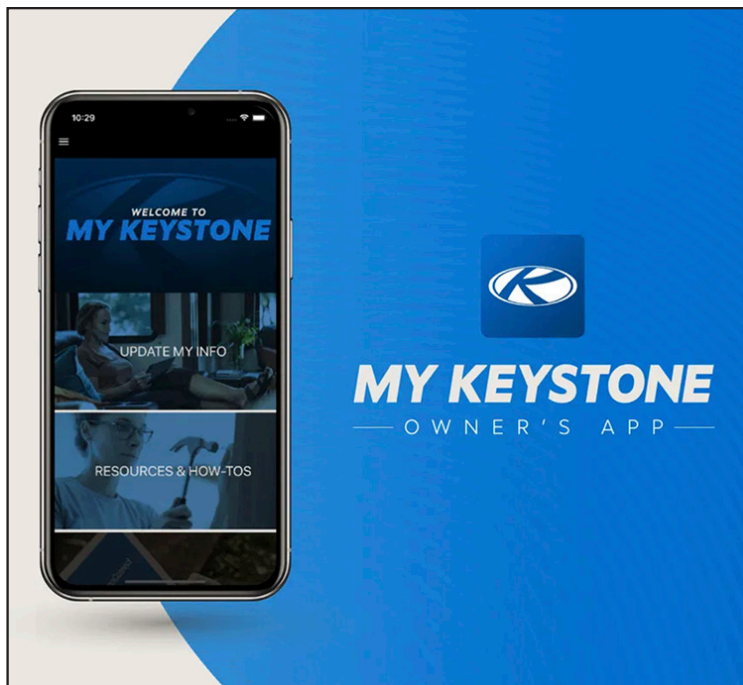
to change.

At the 2022 Consumer Electronics Show in Las Vegas, General Motors CEO Mary Barra unveiled the Silverado EV — and according to a report in the *Detroit Free Press*, vowed to beat the Ford F-150 Lightning in key metrics including driving range, towing capacity and passenger space.

While the Silverado EV is expected to debut as a 2024 model, a lavishly equipped RST First Edition is anticipated to be released in Fall 2023. All production of the \$105,000 First Edition pickup, said to feature an estimated range of 400 miles on a full charge, was spoken for in 12 minutes. Other models can be reserved by visiting Chevrolet's website at chevrolet.com.

As for Ford, the iconic Blue Oval isn't taking this news sitting down. According to Automotive News, Ford will build nearly four times as many Lightnings as originally intended and recently began inviting some of the nearly 200,000 people with reservations to place orders. The Lightning is scheduled for a Spring 2022 on-sale date.

Keystone RV Debuts 'My Keystone' Mobile App



Keystone RV has launched a new mobile app — dubbed “My Keystone” — that, said company sources, is designed to

consolidate key resources to help owners camp more successfully and confidently. The app is free to Keystone owners. Now available at the Apple and Google Play app stores, My Keystone includes manuals and quick start guides, Keystone's First-Time Campers series, how-to videos, DIY program details, maintenance schedules, troubleshooting guides, and a consolidated library of all mobile apps associated with each brand's vehicles. The company will continue to add additional resources

es in the future.

For more information — including links to download the app to Apple and Android smartphones — go to keystonerv.com/mykeystone.

Future Mobility Concept

Concept vehicles are coming thick and fast as the transportation industry plays catch-up with evolving technology — and one of the more interesting examples is “Vision Omnipod,” introduced by South Korean tech behemoth LG at the 2022 Consumer Electronics Show.

According to [LG's website](https://lg.com), the Omnipod is designed to blur the line between the house and the car. The vehicle looks like a standard van on the outside — but on the inside, it comes with a plethora of tech including a slew of LG's own home appliances, including a refrigerator, TVs, and drink dispensers. All these devices would be upgradeable and are standardized for in-vehicle use. The well-appointed interior looks and feels somewhat like a lounge or a sitting area, with a reclining seat and a couch of sorts. According to LG, the



adaptive interior can also reconfigure in real time using a “Meta Environmental Screen.”

While not a lot of other information was forthcoming, the Vision Omnipod

is featured in this short video released by LG featuring the company’s vision for the tech of the future (including robots): [youtube.com/watch?v=4NeM3g807g&t=78s](https://www.youtube.com/watch?v=4NeM3g807g&t=78s).

A Record Run

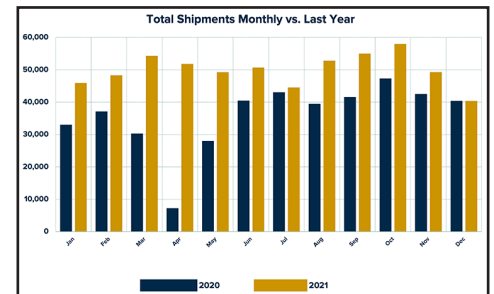
We all know that the popularity of the RV lifestyle — refueled by the pandemic — has hit previously unattainable heights. According to information coming from the RV Industry Association (RVIA), it’s yet to peak. The association’s December survey of manufacturers shows that total RV wholesale shipments to dealers hit 600,240 units.

That’s not only a record, but it eclipses the previous highwater mark for wholesale shipments — 504,599, set in 2017 — by a whopping 19%.

Want more?

According to Statistical Surveys Inc., the data-processing firm that tracks RV retail registrations, the latest figures show that retail sales also were a record-setter for 2021. The Grand Rapids, Michigan-based company has recorded

541,737 registrations in North America (U.S. and Canada) for the year — with one month’s registrations (December) yet to be tallied. The previous mark for 12 months, 515,819 retail registrations, was set in 2020.



Plan to See the Sights

Wondering what interesting locations are worth a visit during your next trip? We ran across a magazine titled *TRIP-info* recently, and found its contents well worth sharing. While it’s directed to organizers of large excursions, there’s a wealth of information on places of interest. For example, the Spring 2021 of this quarterly online publication revolves around “81 amazing Attractions” from Totem Bight State Historical Park in Ketchikan, Alaska, to Winterthur

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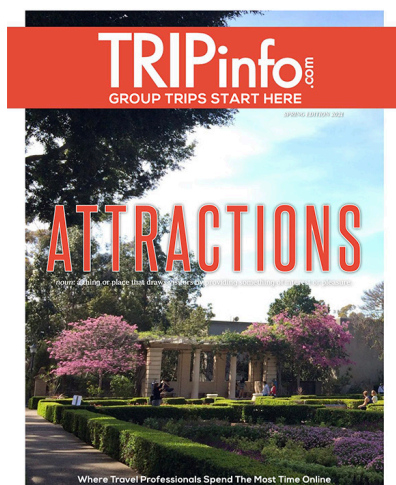
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Museum, Garden and Library on the other side of the continent in Winterthur, Delaware. Other issues are dedicated to such pursuits as casinos, sports, transportation and even shopping. Granted, some of the topics may not fly with your current mode of transportation — the latest issue is all about cruises — but, again, it just may pique your interest...especially since some of the cruises highlighted are along the Hudson River and the Great Lakes. The site also contains information on literally thousands of destinations, most of which are in North America. For more information, visit tripinfo.com/magazines.

Fleetwood RV Debuts Bounder 35GL Class A Gas



Fleetwood RV, a division of REV Recreation Group, debuted the new upscale 35GL floorplan for its Bounder Class A gas brand at the recent Florida RV SuperShow in Tampa. The mid-coach entry configuration features four

distinct living areas, said to make it feel more like a traditional home.

The four areas include: the forward cabin, with couch, multi-purpose Adap-table dinette and LED TV; an open-concept galley with French-door

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Whirlpool refrigerator, three-burner cooktop and angled sink with plenty of quartz countertop space; split lavatory — each with its own sink — with privacy doors to close it off from the kitchen and bedroom; and large master bedroom.

The 36-foot, 3-inch, two slideout

coach rides on the new Power Platform Ford chassis, powered by a 7.3-liter V-8 with 350 hp and 468 lb.-ft. of torque, and includes a 100-watt solar panel, 2,000-watt inverter, exterior entertainment center with LED TV and Bluetooth soundbar and 14-foot awning. Other

features include a towing capacity of up to 8,000 pounds, 5.5kW generator with auto-start and 160 cubic feet of basement storage. For more information, visit fleetwoodrv.com/models/bounder-2022/.

Lippert Debuts New Chassis Protection Finish



An RV's chassis is designed and built to endure many years of abuse, from bad weather to bad roads — but it's not impervious, and ultimately road debris will start to take its toll. Lippert Components, Inc. — the top supplier of towable chassis — announced Jan. 12 that it is upgrading the formula for all powder coatings on all of its chassis headed for RV use. The change comes as a result of Lippert and one of its suppliers, AkzoNobel, collaborating to raise the bar in product performance and innovative manufacturing processes.

Known as Road Defense, the powder coating formula is designed to provide a more uniform density and give the chassis more protection against the elements. It has endured rigorous testing to ensure superior strength, durability and resistance to corrosion, fading, weathering, humidity and more.

Pivotal characteristics of the new powder coating that set it apart include its texture (instead of the traditional high-gloss black). Other key features and benefits include:

- 3x more resilient to salt spray and humidity.
- 5x improved weathering for reduced fading and chalking.
- 2x more resistant to chipping and cracking.
- 4x more uniform coverage for increased protection and performance.
- 3x heavier coating for improved durability and reduced touch-ups.

Enhanced cyclic corrosion score to withstand harsh weather environments. Production of chassis treated to the Road Defense chassis powder coating will begin in early 2022.

continued on page 50

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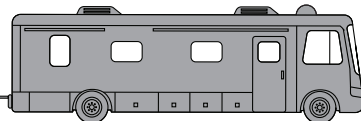
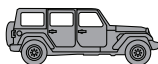


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Roof Membrane is in Sorry State



I own a 2006 Hitchhiker and the rubber roof has pretty much seen better days. After calling a couple of local RV repair outfits, the price seems to be kind of up-and-down and nobody seems to agree on which type of rubber roof material to use. I want to keep the fifth wheel for several more years and would like to have a quality install. Any suggestions?

— **Jim Anderson**

Jim, I can relate to what you're going through. The materials and price can differ quite a bit. There are three basic choices — EPDM, PVC and TPO — and they all vary in price. I prefer the TPO because it won't oxidize as easily as the EPDM, which came on your

rig. TPO will not bleed black stains as readily and, more importantly, it is more tear-resistant than the others. The prep and process to lay down a new roof is labor-intensive and is quite expensive, especially considering the the labor rates nowadays. It's also important that the installer use the proper glue and self-leveling sealant around the vents, seams and other accessories on the roof. You should also consider replacing the roof with one that is more durable and likely be the last one you'll ever have to install. There are a few companies competing in this space, like RV Armor (rv-armor.com), that offer complete renovation and lay down material that offers superior service.

Smelling Propane

I've been smelling propane in my 1997 Pace Arrow 34-foot motorhome for several months and nobody has really been able to track it down. Finally, a friend of mine and I thoroughly went

through every fitting and gas line that we could find and tested them with the appropriate leak-detector solution. After several hours, we narrowed it down to somewhere around the frame-mounted propane tank. After testing the regulator

where it goes into the valve, the hoses and everything else that we could find, we finally discovered it was leaking around the packing nut on the shut-off valve. We tightened the packing nut carefully as



to not strip it, but we still have a small leak. Are there replacement packing parts available for this? If so, where could I purchase them?

— **Gerard Daniels**

Gerard, this is a great question. It's pretty rare that you see one of the valves leaking around the packing nut, but it does happen from time to time. No, there are no packing nut replacements available that I know of — and more importantly, I would not suggest trying to repair a gas valve because you can make things worse. My suggestion is to replace the valve, which should be done by a competent technician certified to work on LP-gas systems.

While you're at it, take the time to check the propane regulator — it should be replaced every five years, whether it looks good or not, for safety's sake. Pay close attention to the vent on the regulator; the newer two-stage regulators have side and bottom vents, so be sure that you get the correct one. While you're changing the regular carefully inspect the neoprene hose that runs from the regulator to the fixed gas pipe attached to the motorhome. Be sure to check all fittings that been changed with your leak detector solution before calling it "good." And to be even safer, have a technician perform a LP-gas leak-down test, which should be done every year or anytime the system has been opened.

Boondocking Batteries



Bill, my wife and I have decided to do a lot more boondocking. While looking on the Internet I have noticed that a lot

of people are switching over to lithium batteries. I also saw that they are rather expensive and I've heard bits and pieces of having to change the charging system to accommodate a lithium batteries. What are your thoughts on this changeover?

— **Jason Siblie**

Although the price of lithium iron phosphate batteries has come down considerably, they are still expensive. If you amortize the cost over a longer period of time, however, the cost can be justified — and the performance is much better. Most lithium batteries are good for at least 10 years. After 10 years of use/charging cycles, there is

still roughly about 75% of the battery capacity remaining. The real bonus, though, is the ability to discharge almost completely while retaining the necessary voltage to operate your appliances and accessories. Open (flooded) cell and AGM batteries should only be discharged to 50% before recharging. Also, lithium batteries are capable of handling several thousand more charging cycles than other batteries. Lithium batteries charge at a different rate, so you will likely need to replace the power converter; most people looking to boondock will install an inverter/charger that can handle the lithium batteries. If you already have solar panels, make sure the charge controller can

accommodate lithium batteries. If you do not have solar and you're going to add a system, you'll need roughly 200 watts per battery to be minimally effective. Of course, the more wattage the faster the batteries are going to charge — and this also will be more effective on cloudy or rainy days. As far as safety goes, all lithium batteries come with a battery management system (BMS), which safely regulates discharge and conditioning. With a good solar system and lithium batteries, you will enjoy your boondocking far more than if you were just depending on a generator.

Nervous About Blowouts



I recently had a front-tire blowout on my 2007 Winnebago Journey. Yes, it was a bit scary, especially for my wife as it was on the passenger side. Somebody suggested that I install Tyron safety bands in the front tires to prevent future scary moments. Do they work as well as they claim? More importantly, are they worth the money?

— **Dean Capo**

The Tyron safety bands (www.tyron-usa.com) really do improve the safety in the event of a front-tire blowout. They are not cheap, but since they only go on the steering axle, you're just talking about two wheels. Blowouts can affect steering, braking and traction, as well as handling. With a heavy motorhome, it's not uncommon to experience rapid deflation of the tire, which can send the motorhome off the road.

Tyron safety bands are installed in the center well of each wheel, which prevents the tire bead from coming off the wheel during a blowout or deflation. When the tire comes off the wheel, handling diminishes — and if the tire comes apart, you'll be looking at quite a bit of collateral damage to the wheel well and other nearby areas, like the fuel filler and other trim. **RVE**

Bill Gehr



Bill started his 50-year career in the RV industry when he went to work for an Airstream dealership. After the gas shortages in the 1970s, Bill decided to start his own business and opened up Bill's RV Service in Ventura, California. After several years in business, he met Bob Livingston, and together they worked on hundreds of technical editorial projects at his shop while becoming great friends. Bill eventually joined Bob on the TV show "RVtoday," filming a number of hands-on projects. After retiring, Bill headed out full-time in his fifth wheel and toured 39 states while writing technical articles for *Trailer Life* and *MotorHome* magazines. He now is Technical Director for *RV Enthusiast*.

New Brands, Models & Floorplans for 2022

Midwest Automotive Designs Passage 148

Campervans continue to escalate in popularity, and Midwest Automotive Designs, a division of REV Recreation Group, continues to stake its claim in the category. The Elkhart, Ind.-based company's latest model is the Passage 148, based on the Ford Transit platform. The all-electric Passage is offered in a single platform with nearly everything included and very few options.

Power for the motorhome is supplied by a 320-watt rooftop solar charging system, 600-amp-hour Lithium ECO Freedom package, ECO chassis battery charging system and 2000-watt inverter/charger with transfer switch, a

system capable of powering the rooftop air conditioner.

In keeping with the all-electric design, the galley comes equipped with an induction cooktop, a 12-volt DC/120-volt AC 7.3-cubic-foot refrigerator and stainless-steel convection microwave, plus solid-surface countertops, molded sink with flush mount cover and a pull-out pantry. Across from the galley is the bath area, featuring a solid surface countertop and sink, porcelain toilet and powered roof vent. Aft of the galley is a spacious lounge area with an overhead wardrobe, removable Lagun table, LED television with FM radio, upgraded speakers and power folding rear sofa bed with under-sofa storage. A privacy shade package and valances with wood inlay and indirect lighting provide solace at day's end.



The Passage 148 is moderately equipped for extended travel with a 32-gallon freshwater holding tank along with 27 gallons for gray, and 15 gallons for black — the former two of which are equipped with heating pads for cold-weather camping. An Espar furnace and a complete insulation package help keep things comfortable when the mercury drops. Exterior features include dark tinted windows, and HD digital air TV antenna, power awning with LED patio light and an all-in-one utility bay that includes an exterior shower.

<https://midwestautomotivedesigns.com>



Airstream International Pottery Barn Edition



While Airstream doesn't have a ton of changes in store for the 2022 model year beyond customary design changes and some floorplan tweaks, the Jackson Center, Ohio-based manufacturer has launched two new models that are noteworthy.

In June 2021, Airstream introduced the all-new Interstate 24X to its line-up of high-end Class B motorhomes. Featuring all-terrain tires and wheels and an advanced power system on a 24-foot Mercedes-Benz 4x4 platform, the adventure-ready 24X taps into the evolving desire for off-grid-capable

motorhomes with the ability to bring along adventure gear. One of the model's highlights is a rear sleeping/living/storage area, a versatile, convertible space that seats up to six passengers. Rearrange the red-stitched, Simtex Marine-Grade Carbon Gray cushions and quickly convert it into the largest sleeping area in any Class

B motorhome — or set it up in one of several versatile configurations.

More recently, Airstream partnered with Pottery Barn to introduce a special edition built on a 28-foot Airstream International platform and designed in partnership with the Williams-Sonoma-owned sustainable home retailer.

Much of the interior design is based on best-selling Pottery Barn designs, including:

- Ultra-plush sofa and dinette seating inspired by the Big Sur collection. All the seating is covered in Performance Boucle fabric, which is durable, easy to

clean and stands up to real life.

- The dinette table, built with oak hardwood, and some of the hardware pulls and knobs were inspired by the popular Benchwright Dining collection.

- Window coverings made using Emery Linen Curtain fabric. The weave of the natural yard-dyed fibers creates dimensional highs and lows for added depth.

- Overhead lockers drew inspiration from Pottery Barn's popular Aubrey beadboard furniture collection.

- The trailer also comes with an exclusive Pottery Barn accessory kit which includes the brand's signature Mason Stoneware Dinnerware, Indio Outdoor Folding Table and armchair set, storage bins and more.

www.airstream.com



DRV Suites Mobile Suites 41RKDB



Full-time travel luxury fifth-wheels have historically been the fodder for retired couples — the size and price point are usually beyond the needs, wants or wallets of younger RV travelers. But, according to Shawn James, DRV Suites general manager, this last year has seen a significant uptick in younger buyers.

“We seem to have picked up a lot more of the younger generation,” James said. “That’s keeping us on our toes to make sure we’re giving those guys the offerings that they want and the look that they want inside the units.”

Like many other manufacturers,

James said DRV isn’t going to “reinvent the wheel” in 2022. That said, the company is introducing a new floor-plan within its Mobile Suites brand. The 41RKDB is a front master bath, mid-bath, rear kitchen fifth-wheel. The 41-foot, 3-inch unit weighs in at 18,300 pounds (dry) and features four slide-outs.

Designed with full-time convenience in mind, the DRV is 101 inches wide with 3¼-inch thick foam core walls for better insulation, a 100-gallon freshwater tank, Garnet See Level tank monitors, disc brakes and residential galley appliances.

A new feature offered on the 41RKDB is Winegard’s new RV Halo Voice virtual assistant system. With the Halo system installed, all functions of an RV installed in the control panel or on the multiplexing system can be controlled with voice commands, like Siri or Alexa. Controllable items include lights, tank levels, HVAC and more. A significant difference between Siri/Alexa and Halo, according to the company, is that Halo doesn’t have to be connected to the Internet to function, a notable benefit for RVers. Halo has Alexa software and functionality, however, so once online it does have the same functionality.

www.drvsuites.com



Forest River Flagstaff

Boondocking — or just getting away from it all — is the biggest trend in RV-ing today, and Forest River’s Flagstaff division has embraced it wholeheartedly for the new model year. With few exceptions — a couple of tent campers where it’s not feasible, noted Andre Fisher of the Flagstaff sales department — all Flagstaff towables will come solar-prepared in 2022. Not just with solar prep, which is common in the industry, but equipped with a 190-watt solar panel, 1,000-watt inverter and set up for either twin 6-volt or 12-volt batteries.

The system, which is capable of being expanded to 600 watts (including an optional second 190-watt panel from Flagstaff), also is more user-friendly,



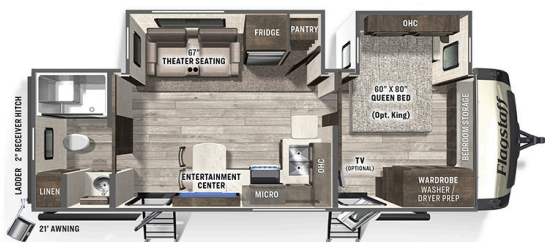
with all plugs inside that connect to the inverter labeled as such so customers will know which plugs work off the inverter. Where feasible, Flagstaff also increased the size of holding tanks.

New floorplans for 2022 include the Classic Suite 826RBS, the second in an expanding line of two-slideout travel trailers within the Classic Super Lite brand built with couples in mind.

“We were going to bring this out last year but held

off to see how our initial Classic Suite — the 826MBR — would be received, and it was extremely successful,” said Fisher. “The Classic Suite is designed for people that are downsizing but still want luxury — it’s the most luxurious model available under 30 feet — but still comes in under 30 feet so customers aren’t limited when visiting national and state parks.” The difference between the two floorplans is bedroom location: the 826RBS features a front bedroom suite, while the 826MBR places the bedroom mid-coach.

<https://forestriverinc.com>



Aliner Family Expedition Series



Allan Reeping, president of Aliner, based in Mt. Pleasant, Penn., reported that during the past year his company took the opportunity to streamline its operations to improve quality and increase production capabilities. These new units, he said, sleep a family of four comfortably with three separate beds. The trailer is based on the previous version of the Expedition, built on an 18-foot main box but has modifications for sleeping arrangements.

"Our goal was to try and attract younger families of four or five to the

mix with a product that they can store in the garage instead of having to pay for storage or leave a cumbersome big trailer in the yard," explained Reeping. "It's also easy to tow so they don't have to buy a big truck."

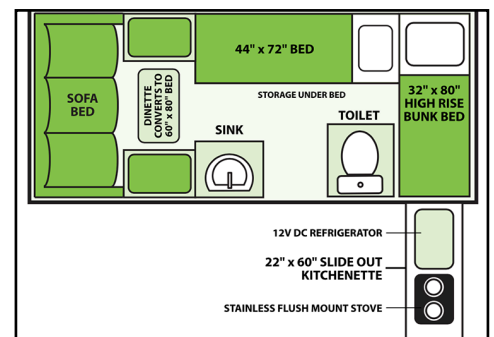
The 18-foot-long Family Expedition — built using Azdel composite interior wall and ceiling panels — will weigh in at about 2,000 pounds (UUV) with around a 3,500-pound GVWR. The dry hitch weight is projected at about 250 pounds.

To accomplish sleeping four on the

Family Expedition, Aliner moved the kitchen to the outside in a slideout configuration with a 12-volt DC Norcold portable refrigerator and a stove. In the interior remains a swivel cassette toilet and a sink. Additional features include a furnace, Command A/C with heat pump, 35-amp converter, dual skylights with night shades and 14-inch tires and wheels. The MSRP for the Family Expedition will come in at \$26,000 to \$29,000 with the Family Scout at \$16,000 to \$18,000.

Also of note, Aliner has its Dormer Option available on both these models that opens the trailer interior up to more resemble a travel trailer that is walkable from end-to-end. There are soft tent dormers or solid panel dormers available for an additional cost.

www.aliner.com



Forest River Cherokee Timberwolf

The Forest River Cherokee Group of towable brands includes many of the top-selling trailer brands in the RV industry, including Alpha Wolf, Artic Wolf, Cherokee, Wolf Pup, Grey Wolf, Sabre, Rogue and Wolf Pack — but the group's newest shape for 2022 is also one of its biggest.

The Timberwolf is a destination trailer, available in four floorplans from 42 feet, 8 inches to 42 feet, 11 inches and GVWRs of 13,095 to 13,650 pounds. Designed to be set up in an RV park (or private land), the Timberwolf is available in three configurations: the overall Limited Package as well as Base Camp and Campfire additions offering a host of features. Standard equipment — built around the Power Gear frame tech-

nology with space-saver rail design — includes an 11-cubic-foot 12-volt DC refrigerator, Chef Select black stainless-steel kitchen suite (with residential-style farmhouse sink), back-up camera system, LED lighting, 15,000 Btu central air-conditioning, tire pressure monitors and even a ceiling-mounted subwoofer with accent lighting. Each also features the "Total Control" app for keeping track of electrical functions remotely.

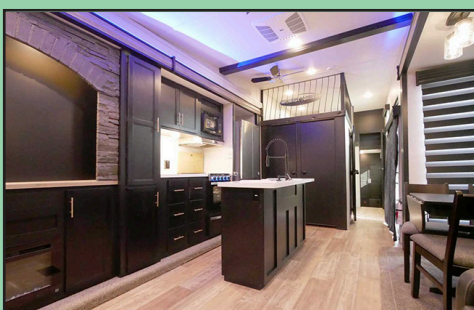
The Base Camp package adds things like a black tank flush-out kit, outside shower and "armored" underbelly, while the Campfire package includes (among other things) an entertainment system, high-output attic fan in the bath,



roof-mounted ducted A/C and a change to the dinette.

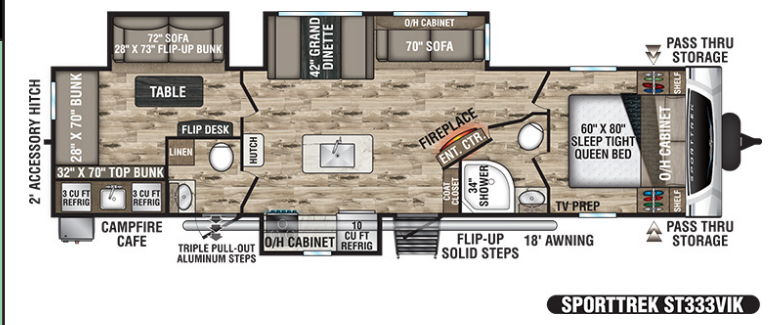
Each of the four floorplans is designed with a loft for extra sleeping or storage. The 39CA, 39DL and 39LB are three-slideout floorplans, while the 39SR offers a four slideout arrangement. Floorplans also are distinguished by placement of the master bedroom suite (front or rear) and bath (rear or mid-coach). MSRP's begin at around \$65,000.

<https://forestriverinc.com>



A photograph of two young women in a dorm room. One woman, wearing a light-colored long-sleeved shirt and grey pants, is kneeling on the floor. The other woman, wearing a teal t-shirt and grey pants, is sitting on a black folding chair at a desk, working on a laptop. The desk is cluttered with various items, including a box of pens and a small container. A bunk bed is visible in the background, and a window with patterned curtains is to the right. The floor is made of wood-look laminate.

One such new floorplan is the Sport-Trek ST333VIK which, Boggs said, is an island-kitchen model with appeal to a broad audience, replacing the traditional rear bunk room with a flex room. "We have a sofa with a table, which can be used for sitting, doing crafts, or as a workstation. And in addition to the table,



<https://www.venture-rv.com>

A large, modern motorhome, likely a Class A model, is shown from a front-three-quarter view. The vehicle is dark-colored with silver and white decorative graphics. The word "EXPLORER" is prominently displayed on the front of the hood. The motorhome has a large windshield, multiple mirrors, and a prominent chrome grille. It is parked on a light-colored surface.



February 19

Step Lively

Maintaining entry steps will promote smooth operation of the mechanism and sure footing with the installation of new grip tape.



RV entry steps, whether on a towable or motorized RV, take a beating on a daily basis. Making sure they are in good working order and provide solid footing is paramount.

By Bill Gehr / Photos by Bob Livingston

No one ever stops to record how many times occupants go up and down the entry steps on their RVs on a daily or weekly basis, but one thing is for certain: There is a lot of stress applied to all the working parts and joints of those steps. When you first step on the bottom platform, tremendous leverage is transmitted through the entire step linkage system and all its contact points. A quality step support and regular lubrication will extend the life of this step for many years — there's nothing worse than step failure right in the middle of your trip.

The second part of keeping your steps in good working order is to make sure the rungs have enough traction

to maintain a solid foothold, especially in wet conditions. As part of any regular maintenance program, it's important to make sure the anti-slip material is not worn out and/or peeling away. For those steps without slip protection, a stick-on product can be found on Amazon and at home-improvement stores for this purpose (more on this later).



During an annual close inspection of any RV entry step system, identifying linkage areas where lubrication is necessary will ensure the smooth operation. It's also best to have someone bounce on the bottom rung to check for any areas where the mounting locations may have become worn or damaged.



Areas demonstrating abnormal wear should be treated with a light layer of grease. This grease will have to be cleaned off and re-applied on a regular basis.

First Things First

All entry steps have moving parts, even one-piece assemblies that fold up into the doorway of an RV. Moving parts that are not lubricated periodically will eventually cease to move freely and typically wear out before their time. Electric steps used on most motorhomes also require lubrication. For these steps, it's necessary to lubricate the linkage and the gearbox, because the motor senses overload if the steps are binding. Over time this overload may stop the steps from extending all the way or prevent them from retracting.

Basic folding steps that have been used on travel trailers and fifth wheels for many years have anywhere between 15 to 20 lubrication points. Do not use grease or heavy oils to lubricate the joints as they will attract dirt that may cause binding. A light, dry type of oil works well; one of my favorites is Tri-Flow Superior Lubricant with PTFE. This goes on lightly, dries almost completely and removes dirt and corrosion — and it remains in place for a long period of time. The drip bottle has a plastic straw that allows the user to direct the lubricant with control. Lubricate every joint and work the step in and out several times — then repeat this process again and allow the lubricated points to dry. Tri-Flow Superior Lubricant sells for \$6.90 on Amazon and is available at hardware stores and Walmart.

When the step is unfolded, pay close attention to the pressure points that support the bulk of the mechanism. You will see where the weight of the step and metal-to-metal contact areas are causing abnormal wear. A very light coating of grease should be applied to these wear points and will need to

be wiped off and renewed periodically to prevent a build-up of dust and dirt that can impact step performance. Doing so will extend the life of the steps.

The one-piece step assemblies that fold into the doorway do not require much lubrication, but the leveling legs that telescope in-and-out it should be protected with a dry lube to assure smooth action and, again, to prevent

the collection of dust and dirt. The locations where these steps are attached to the inside of the trailer may also need a little bit of grease to prevent wear.

Electric motorhome steps have very few lubrication points because they have fewer joints than those found on trailer and fifth wheel steps. Use the same type of light oil and lubricate every point that pivots. Crawl under the motorhome to inspect the side of the step (do *not* get in the step's path in case it folds up unexpectedly). Have someone open and close the motorhome's door in order to locate the lubrication points in the motor linkage. Use the same light oil that will dry in place for these joints. Check with your owner's manual to determine if the gearbox needs to be disassembled and re-greased; this grease can dry over a period of time. While you're under the motorhome, inspect the wiring for any loose or corroded connections.

Whether you have a travel trailer, fifth wheel or motorhome, crawl underneath on the side of the step and have somebody put some weight and bounce slightly on the lower step while you watch the floor or the support to make sure it is not compromised. You will see a lot of movement if there is an issue. If any of the joints or pivot points look abnormal or stressed, replace the steps. Step failure can cause bodily injury.

Getting Traction

Most RV steps are covered with a non-skid material, which prevents accidental slips in wet conditions. Unfortunately, this material does not last forever and should be inspected annually and replaced when pieces are missing or the surface (grit) is worn out. You can purchase this type of material

at hardware stores or online. While there are a number of such products readily available in 4- to 6-inch rolls, we experimented with Skateboard Grip Tape that comes in 11- x 44-inch sheets. The application here is unconventional, but skateboard riders need superior "stickiness" so we figured this stuff would work — and it exceeded our expectations. The Skateboard Grip Tape sheets are available on Amazon for \$12.99.

Before replacing the non-skid material, remove all the old pieces — including the glue that's stuck to the metal. This can be accomplished with a metal scraping tool. Now is also a good time to clean the entire step assembly and paint it to prevent rust and restore its finish. Once the old tape is removed, clean the step surface with alcohol. The grip sheets were cut into 4- x 23-inch strips, which fit perfectly on the steps; two strips were placed on each step. The adhesive stuck well and after months of heavy use there are no signs of lifting or wear — and the grip provides a very positive foothold.

Better Support

If your RV is older than a couple of years, chances are it didn't come factory-equipped with the latest generation



Tri-Flow Superior Lubricant is an excellent product for removing dirt and corrosion and restoring a smooth mechanism for opening and closing the entry steps.



A few drops of Tri-Flow lubricant is applied to the joints in the entry steps. The drip bottle and plastic straw help control the flow of lubricant.

of entry steps which extend fully to the ground for maximum support. For steps designed to extend and “hang” with the first step above the ground, adding a support under the bottom rung will provide additional stability and extend the life of the steps. There are a number of these supports on the market, usually using threaded rods and a metal pad. Some people even make their own out of wood.

One of the best supports we’ve seen of late is the Solid Stance Step Stabilizer Kit from Lippert (<https://store.lci1.com>). It attaches permanently to the bottom rung and has two adjustable legs that can be set at four angles. It extends 5 to 14 inches and offers strong support for an undulating ground. The step stabilizer, which retails for \$42.95, can be folded up quickly before storing for travel. We’ve been using the old-style support with the threaded rod and pad — which has served us well — but after checking out the Solid Stance, one



The old grip tape on these steps has seen better days. There’s not much grip any longer and pieces are peeling off the step.

will be installed on the test fifth wheel in the near future.

Entry steps are arguably the most heavily used component on an RV and

keeping them in good working order — which is not that hard to achieve — is critical to safe footing and accident prevention.



A metal putty knife was used to remove the old grip tape. It takes a while to remove all the tape and if you get lucky, large chunks at a time will pull off the step surface. Once the tape is removed, take the time to wash the steps thoroughly and repaint to restore the finish.



7

The 11- x 44-inch sheet of Skateboard Grip Tape, available from Amazon, was measured to fit the steps. Two pieces of 4- x 23-inch material was cut for each rung.



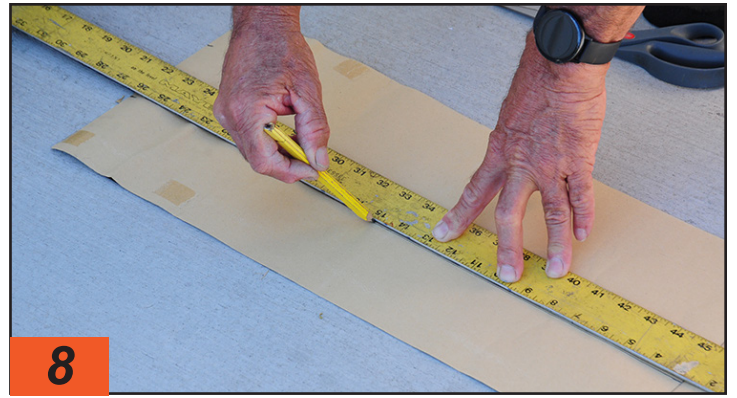
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Before applying the cut-to-size Skateboard Grip Tape, each rung was thoroughly cleaned with alcohol to ensure the adhesive will stick and cure properly.



11

An RV step support with a common configuration of a pad for the ground and a threaded rod is attached to the bottom rung to provide better stability. The bottom rung takes most of the beating due to leverage applied when entering and exiting the RV. Another option is to use a carpet cover on the bottom step, which will help remove debris from shoes while still offering traction for a solid foothold.



8

Using Skateboard Grip Tape sheets is unconventional but resulted in material that is durable and lasts a long time. Here, the sheets are cut to size to fit the entry step rungs.



10

Once the adhesive backing is removed, the grip tape will immediately stick to the step surface. The diamond silicone grit provides sure footing and is nice looking. Skateboard riders will attest to its "stickiness."



12

Lippert's Solid Stance Step Stabilizer Kit offers good support for the entire length of the bottom rung, promoting greater safety for users. The heavy-gauge steel support system is installed permanently and has independent adjustment legs that can be set at four angles.



Brighten Up Your Night

Replacing the patio rope light — or one that throws a weak beam — with a super-bright LED fixture takes little time but offers big results.

By Bob Livingston / Photos by the author

Lighting up the patio area of an RV seems simple enough; just about every RV made has some type of fixture on the outside wall in the vicinity of the entryway to achieve this goal. Providing adequate outside light and the requisite visibility at night to negotiate the entry steps are fundamental necessities.

Rather than mounting a standard-type fixture above the entry door, however, many manufacturers are adding rope lights in a strip rail below the awning fabric and roller tube. It's a nice way to conceal the light when not in use, but over time these rope lights lose their brilliance as the sun has its way with the plastic casing — and when the awning is retracted, the light becomes partially obstructed. Adding an LED fixture in lieu of the rope light will substantially increase the outside coverage — and provide better illumination on the steps and area outside the door.

We originally featured a bright exterior light fixture — the Dream Lighting LED Heavy Duty Awning Light Bar (<https://amzn.to/3vzlt-nM>) — as part of “The Gadgeteer” column in the November 2021 issue of *RV Enthusiast*. At the time, it had been installed on a friend's Cameo fifth wheel and had been operating

flawlessly for more than 1 ½ years (and is still working). Knowing that, we decided it would be a good candidate for replacing the rope light in our own Grand Design Reflection fifth wheel. Clearly, the 720 lumens of cool light provided better coverage than the stock light on the Cameo — and after this installation the new fixture did not disappoint.

Since you'll be removing the rope light, the empty strip rail provides a perfect raceway for routing the wires to connect the fixture to 12-volt DC power, which was already at the front end of the rope light and connected to a switch inside the fifth wheel. Routing loose wires are less than tidy so we elected to use a 16/2 cable, which fit nicely in the strip rail below the awning. Other parts needed include butt connectors and silicone sealant.

The first step was to release the rope light from the strip rail and pull it out. At the factory, the front end of the strip rail was crimped just enough to retain the rope light and silicone sealant was applied originally to make sure there was no

movement. It took a little time to scrape away the silicone and spread the railing enough to free the rope light, which consequently came out quickly and in one piece.

Measurements were taken to center the new fixture below the awning and a notch was cut into the strip rail to route the power leads and give it a “factory installed” appearance. The cable fit inside the strip railing perfectly and blended in, making it almost imperceptible. You have to make sure that there are no rough edges in the notched area that can abrade the cable.

The light fixture was designed to be flush-mounted with the wire routed directly behind the base, which makes sense when replacing an existing fixture with a wire extending through



1 To begin, the end of the strip rail was opened to allow the rope light to slide out without getting hung up. More importantly, you don't want the wire cable to get damaged when installing in the rail.

a hole in the exterior wall. If that's the case, it's a direct swap and only takes a few minutes to get it done. For this project, the wire leads would have to be exposed somewhat, since they are being routed from the strip rail. A hole was drilled in the side of the fixture base (between the cooling fins) and the cable was routed into the base and connected to the light's power leads. After

positioning the new fixture as close as possible to the rolled-up awning tubing, the wires seemed to "disappear." The fixture was screwed into the sidewall, sealing the threads with silicone. Figure on no more than a couple of hours for the entire project.

This fixture throws a tremendous amount of light via a 40-degree down-cast beam. For some, in fact, it might

be too bright, depending on whether light is needed to cook dinner on a barbecue or for lounging around sipping a glass of wine later in the evening. Fortunately, this fixture is compatible with a dimmer switch. Just remember to be respectful of your neighbors and turn the light off when you retire for the evening.



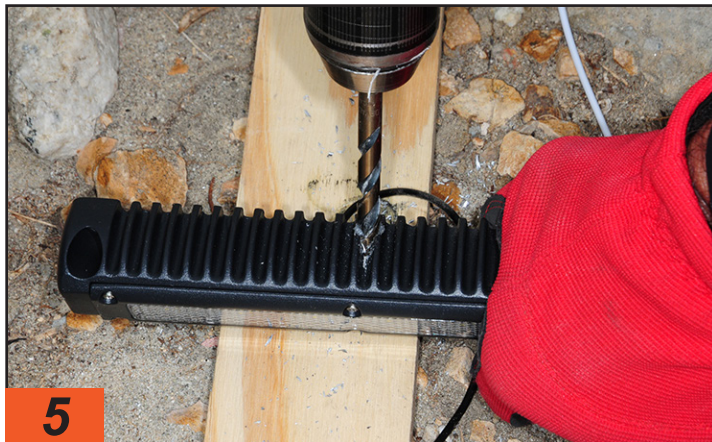
A razor knife was used to carefully cut away the glob of silicone sealer that was installed by the factory to prevent the rope light from moving. It was also necessary to use a metal putty knife to remove the excess silicone sealant.



The 12-volt DC power leads were cut before pulling the rope light out of the strip rail. Make sure the switch is in the "Off" position to prevent shorting when cutting the wires.



Once the power leads were cut and the silicone removed, the rope light slid out from the strip rail with virtually no effort. It was obvious that constant exposure to the sun had its way with the casing, which was no longer clear and reduced light output.



The new light fixture was prepared by drilling a hole in the side of the base to allow a pathway for routing the power leads. This particular fixture was designed for hooking up the wires through a hole in the sidewall behind the base cover, thus the modification was necessary.



After measuring for a center mounting location, a notch was marked and cut in the strip rail to allow the wires to run down to the light fixture. Long-nose (sometimes called needle-nose) pliers helped open the ends and a file (not shown) was used to remove any sharp edges.



7a



7b

Silicone-based oil was rubbed on the wire jacket to make sure it would not get hung up while pushing into the strip rail. This additional prep paid off handsomely as the cable went in without any hang-ups.



8

The new power cable was pulled out through the notch in the strip rail with long-nose pliers. Extra cable was pulled to make it easier to wire the light fixture. Once connected to the fixture, any slack was removed by pulling the front end of the cable.



9

Butt connectors with shrink-tubing ends were crimped to the power leads in the fixture base. Using this type of connector ensures that the wiring will remain weatherproof, which is important for any fixture subjected to the elements.



10

The wiring inside the fixture was neatly tucked inside the base. Silicone sealant was applied to the hole in the side of the base where the cable was routed.



11

The new light fixture was centered on the sidewall, close to the awning fabric (the awning was opened about a foot to make it easier to wire the fixture). Once the fixture was mounted, the awning was retracted fully and the cable "disappeared."



Pilot holes were drilled in the sidewall to make sure the fiberglass would not crack when driving the stainless-steel screws needed to hold the fixture in place. Silicone sealant was applied to the screw threads before driving into the wall.



The last step was to connect the original power wires to the new cable. Again, butt terminals with shrink-tubing ends were used to weatherproof the connections. **RVE**



parts.revgroup.com/store



Turning the Corner on Water Leaks



The intersection of sidewalls is a major incursion point for water in an RV, especially with older travel trailers and fifth wheels. Fortunately, it's an easy repair.

By Mark Polk

When RVs travel down the road, they flex and twist. Manufacturers plan for this by using a pliable sealant at all joints and seams, but it's not perfect. After years of use, the sealant eventually dries out — and as the RV is subjected to less-than-optimum road surfaces, the dried-out sealant cracks. Eventually, all this movement makes seams vulnerable to water damage.

In an attempt to stop or fix water leaks, RV owners will usually add more sealant, but more often than not, this does not solve the problem. When an inspection reveals water damage — or compromised seams where water can find a way in — the only option is to remove the suspect seal and replace it.

That's not as difficult as it might sound. Just about anyone familiar with what's in his or her toolbox can replace the errant seal in an afternoon. You'll need a cordless screw gun, caulking gun, staple gun and the Seal-Tite Corner Seal Kit from Dicor Products, a division of Dicor Corp. This kit contains everything needed to provide a durable, flexible and virtually impermeable seal between the exposed corners: two rolls of high-tack adhesive tape, six tubes of non-sag cap sealant, a plastic

putty knife and a spray bottle for water used in the clean-up process. Between the cap sealant and the tape, there's enough product to repair about 100 linear feet, and the tape comes in three widths — 1.25, 1.5 and 2 inches — for covering just about any problem. The tape also is extremely flexible, which is perfect for conforming to the contours of a corrugated exterior RV wall used in many stick-and-tin towables.

Begin by carefully removing the insert trim, screws and the molding from the area you are re-sealing. After the insert trim is removed, inspect

it; if it's old or discolored, it can be easily replaced. Removing the insert trim allows access to the screws for attaching the corner molding to the RV. Do not bend or kink the molding, as it will need to be reinstalled. Carefully scrape away and remove any putty tape or sealant on the backside of the molding and on the RV, then clean the area on the RV where the corner seal will be applied. I usually start with soapy water, followed by denatured alcohol and a clean cloth.

One note here: Like most everything else, the key to a good seal is proper prep. Thoroughly clean the surfaces of any residue from the previous butyl tape/caulking. Now also is a good time to inspect the screws (and staples, if so equipped) you've removed; replace any that are rusted to ensure an optimum seal held together as tightly as possible.

To make sure the corner seal is applied accurately, temporarily hold the cleaned molding on the RV corner being repaired and carefully mark the wall along the edge of the molding with a pencil — this will serve as a guide when applying the tape. Now, apply the tape, starting at the top. Following the pencil lines, press the tape firmly to ensure it conforms to the siding. Follow this up with a half-inch bead of the cap sealant along either side of the inside of the corner molding. While the tape will seal the corner by itself, the non-sag sealant acts as a secondary line of defense against the elements.



The Seal-Tite Corner Seal Kit from Dicor Products contains enough product to cover 100 linear feet.

Now, replace the trim molding — again, using new screws if necessary — and tighten the screws until the sealant just begins to ooze out from under the edge of the molding. Do not over-tighten. Use the putty knife to remove any excess sealant. Apply a small finishing bead of sealant to the exterior seams of the molding, then spray it with

water from the bottle so it won't stick to the tip of your finger or a shop towel as you smooth it out. Finish the job by reinstalling the insert trim.

As noted earlier, this isn't a difficult job — and neither is it an expensive repair when you do it yourself. The complete Seal-Tite Corner Seal Kit — available through Dacor Products, online

or at most RV dealer accessory stores — will set you back about \$140-\$160, depending upon the width of the tape required. The final product will not only look good, but you can rest assured there won't be any more leaks from the resealed corner molding.



1 To begin, remove the molding insert to reveal the screws affixing the molding to the corner. If the old insert can't be cleaned, it can be replaced.



2 With the screws removed, carefully disengage the molding from the corner. Be careful to not bend or kink the molding so it can be reinstalled.



3a



3b

Using the plastic putty knife included in the kit, carefully remove old caulking from the back of the molding and the RV's exterior walls.



4

Clean the area on the RV where the molding will be reattached. I start with a soapy water to remove any remaining dirt, followed by denatured alcohol using a clean cloth.



6

To make sure the corner seal is applied accurately, hold the cleaned molding in place on the RV and scribe a line with a pencil along the outside edge to form a guideline for the tape.



5a



5b

The siding is held in place with staples — replace any that are rusty or damaged to ensure the structure is held together as tightly as possible. If you don't have a staple gun, they can be rented at many hardware stores and big-box locations like Home Depot.



One area where a lot of RV owners make a mistake is by using too much caulking around seams. All the caulking needs to do is fill any void between the molding and the sidewall. Caulking guns can be found for as little as a couple of bucks, but you should invest in a quality gun if you own an RV. The suspect area should be cleaned with denatured alcohol or mineral spirits, after which you can lay down a small bead of caulk; cut just the tip off the tube, at about a 20-degree angle so you can apply it easily. Once the bead is finished, spray the bead with water (or wipe the tip of your finger on a rag soaked with the alcohol or mineral spirits) and carefully run your fingertip along the bead. You can use just your bare fingertip, or cover it with a clean shop towel. Stop every 5 or 6 inches to wipe away the excess sealant on another towel. This tapers the caulking while pushing it into whatever open area might exist, making a nice transition between the molding and the sidewall — and prevents excess caulking from building up and making a mess.



7

Apply the corner seal tape from the top of the seam down to the bottom, using the scribed line as a guide for positioning the edge of the tape. Press firmly to make sure the tape conforms to the siding.



8

Run a ½-inch bead of the cap sealant along either side of the inside of the corner molding.



9a



9b

Be sure to inspect and replace any rusty screws, then affix the molding in place. Set the corner molding in place and screw into position. Be careful to not overtighten the screws — they should be tight enough to just begin to force the sealant out from under the molding.



10

Use the putty knife to clean the excess sealant from the edges of the molding.



11

Use the putty knife to clean the excess sealant from the edges of the molding. Apply a small finishing bead of the cap sealant to the exterior seams of the molding, then use the spray bottle to mist the finishing bead of the sealant with water so it doesn't stick to either a clean shop towel or your finger as you smooth the bead. Reinstall or replace the insert trim, and you're done.

Mark Polk



Mark Polk is an acknowledged RV expert and the founder of RV Education 101, an RV video and information company that produces and sells RV online video and e-book training courses. Through its websites and YouTube channels, RV Education 101 has helped educate millions of RV owners since 1999 on how to use and maintain their RVs safely and effectively. Polk is also the author of the bestselling book *The RV Book*, a guide to understanding and enjoying your RV.

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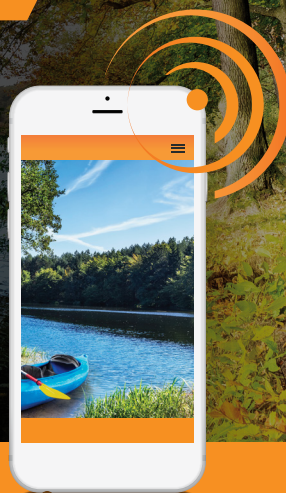
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A Sanitary Solution



Replacing and maintaining the valve seal in a Dometic 310 or 320 RV toilet assures that noxious odors will stay in the holding tank. The process is simple but you have to get over the “icky” factor.

By Bob Livingston / Photos by the author

It's a dirty job, but someone has to do it. Maintaining an RV toilet is not the most desirable chore — but let it go too long and you'll find yourself searching for the nearest bush. Beyond basic cleaning, the most common malady is a dried-out or damaged valve seal which prevents fresh water from standing in the bowl, ready for the next use. When operating properly, after flushing the toilet water is allowed to flow into the bowl, providing a natural seal against odors coming out of the holding tank. When it doesn't happen, the lack of water can lead to obnoxious odors seeping past the valve seal — and it doesn't take a lot to fill the relatively small quarters in an RV.

Over time — sometimes shorter than expected — the valve seal in the Dometic 310/320 toilet will become

damaged from hard water deposits and crud that was not flushed properly, not to mention paper becoming logged in the valve (again, from poor flushing habits). It also can become abraded from hard-water deposits that have been allowed to build up on the valve. Fortunately, this seal can be replaced without removing



1 Turn off the water source and clean the bowl before starting the process to replace the valve seal. Hard water deposits can be removed with Lime-a-way.



Allow the Lime-a-way to sit in the bowl for 15 minutes or so and clean vigorously with a toilet brush. Scrubbing the ports in the rim of the bowl will also loosen calcium deposits and restore the flow of water while flushing.

the toilet, although it's not a pretty job.

Replacement seals can usually be found at RV supply stores and online. It's best to keep a spare in your RV; during the supply chain back-up, these seals were a little scarce. They are not cheap; a Dometic-branded seal will cost upwards of \$37 off the shelf (around \$29 at Amazon). Generic seals are available for less than half price, but we have not used them, preferring to stick with the Dometic seals which have always fit in the opening without undue effort.

There are two ways to accomplish a seal replacement: You can simply pull out the old one and put in the new seal — or you can take the time to do it right. We subscribe to the latter.

The first step is to turn off the water source and clean the valve thoroughly. Oftentimes the surface of the valve will be caked with calcium that should be removed. A good dose of Lime-a-way will dissolve most of these hard-water deposits. Once the valve surface is smooth to the touch, hold the flush lever down and stuff some paper towels into the hole. You can use an old microfiber or cotton cloth, but paper will eventually dissolve if it accidentally makes its way into the holding tank. This will catch anything that is accidentally dropped — including the seal — into the pathway to the holding tank. Foreign items that are allowed to get into the holding tank can create misery later.

Removing the old seal is, well, icky — there's no other way to describe it. As gross as it seems, however, you may not want to wear gloves because you'll need a good grip to maneuver the seal.

(Of course, remember to wash your hands with hot water and finish with sanitizer.) After removing and discarding the old seal, the area around the opening was cleaned with a rag and paper towels. Then a putty knife was used to remove any calcium build up on the valve. If you are not proficient

with a metal putty knife, consider going to plastic, although it's not as effective. Also, if you think you might let go of the putty knife while working on the valve, tie a string through the hole in the handle and the other end to your belt or stationary object. It takes some patience to remove all the calcium, but it's important that the valve does not act like sandpaper when opening and closing. In the end, the leading edge of the valve should be smooth and conform to the original curvature.

The valve is closed before installing the new seal. To seat the valve, it's just a matter of getting the rubber to tuck in around the hole. Usually, it takes only a few minutes to accomplish this task, but if it resists apply a dab of plumber's grease to seat the rubber. Open the valve to make sure the seal is fully seated, remove the paper towels and proceed to coat the top of the valve and seal with plumber's grease. Use a thin layer of the grease; more is not better. We've had great luck with Oatey Plumber's Faucet and Valve Grease, which is available in most home improvement stores for around two bucks. The 1-ounce tube will last a long time. There's no getting around the fact that hard water will play havoc with toilet seals, valves and water ports for the bowl. Cleaning these areas frequently will prevent calcium build up and using Lime-a-way every couple of months will also extend the life of the seal. Consider coating the seal and top of the valve monthly with plumber's grease. Your toilet, RV's occupants and guests will thank you.



Stuff paper towels down the hole before removing the old seal. The towels will catch the seal if you accidentally let it go during the removal process. It's best not to use a rag here in case it falls into the holding tank. Paper towels will eventually dissolve somewhat where a rag will just clog up the system.



Clean around the valve opening with a microfiber rag will catch most of the crud that has built up over time. Loosened deposits will be captured by the paper towels.



The old seal will simply lift out of the hole. Bare hands work best for this job, although it's admittedly pretty gross without using gloves. Just remember to wash your hands with soap and hot water after the job is done and finish with a dose of sanitizer.



6

Carefully clean around the edges of the valve opening with a putty knife to remove caked on hard-water deposits. If you're not proficient with a metal putty knife use plastic, but it won't work as well. You don't want to scratch or gouge the valve surface. The putty knife was used to remove deposits on the leading edge of the valve. Tie a string to the putty knife handle and yourself to prevent dropping it into the tank or pipe by accident. To access the valve opening fully, the paper towels can temporarily be pushed further into the pipe.



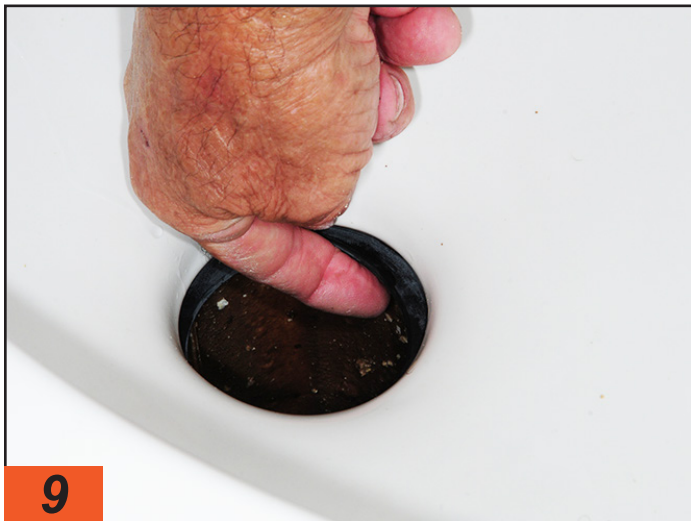
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Once the valve is clean and smooth to the touch, close the valve before installing the new seal.



8

Work the seal around the edges of the valve opening until it seats. Usually there is no resistance, but if there is, apply a thin coat of plumber's grease.



9

Open the valve and work your finger around the seal to ensure that it has seated completely.



10

Clean the top of the valve and seal again to make sure it's dry and ready for a coating of plumber's grease.



11a



11b

We have found that one of the best products for protecting the valve and seal is Oatey Plumber's Faucet and Valve Grease. This grease, available in home-improvement stores and online, will promote a smooth valve operation while preventing the build-up of hard water deposits. Apply a thin layer of grease to the top of the valve and around the seal. Don't overdo it; more is not necessarily better and will only make a mess.



12

The bowl now holds water, which will prevent noxious odors from the holding tank. Regular maintenance, cleaning with Lime-a-way and re-applications of plumber's grease will ensure that the seal will last much longer. **RVE**

Cutting the Cord



As campsites become tougher to reserve on popular weekends, the RV industry moves to develop systems capable of supporting a lifestyle untethered to shore power.

By Bruce Hampson

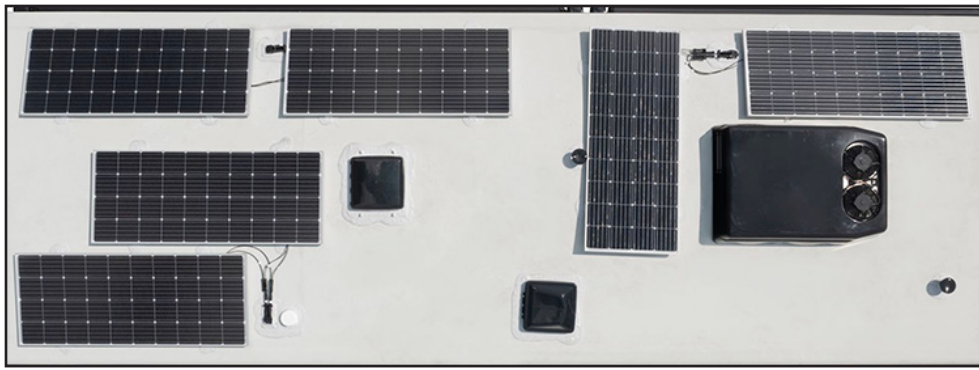
It's one of the great conundrums of the RV industry: As manufacturers continue to ship motorized and towable units to dealers at a record pace, ever-greater numbers of RV owners vie for a finite number of campsites where they can enjoy them.

Rather than being perceived as a brake on RV sales, however, the relative scarcity of campsites — especially on popular holiday dates and weekends — has given wings to an RV lifestyle nearly as old as the industry itself: off-grid camping. Well before there was Kampgrounds of America and Yogi

Bear's Jellystone Park Camp-Resorts and innumerable other RV parks and campgrounds, outdoor enthusiasts took to open spaces. Today, however, they want to do so without sacrificing the morning coffee, air-conditioning and evening movies — and that takes power, usually the kind of power a camper only gets by hooking to the electrical pedestal at a campground. It's a quandary that is increasingly being answered by manufacturers and after-market suppliers alike.

"It's something that a lot of us in the industry have been concerned about

for a handful of years — how do we create a product that the consumer doesn't have to use in a campground?" said Cody Schade, product manager for Forest River Inc.'s No Boundaries and IBEX "adventure trailer" lines. "Having those conversations is what led us to develop No Boundaries, and now we're adapting some of its traits to other (Forest River) products. I think as the industry works its way through some of the issues currently confronting it — such as getting parts through the supply chain — you're going to see this topic take on greater significance."



Jayco's Overlander EXT Modular Power Management system includes six Renogy 200-watt monocrystalline solar panels, six 12-volt 100AH lithium batteries (for 7.2kWh of stored power), a 3,000-watt pure sine wave inverter charger (with 50-amp bypass), a 100-amp charge controller and a 600-amp battery monitor.

What defines an off-grid RV capable of maintaining the RV lifestyle without being tethered to shore power?

As Schade told *RV Enthusiast*, two top requirements would be "more water capacity — or the ability to filter its own water — and a more robust energy system that can operate all of the appliances." Not coincidentally, they also help to describe RVs designed and built for more serious "off-road" use.

"I think we're still as an industry work-

ing to define the differences between 'off-road' and 'off-grid,'" said Schade. "An off-road RV needs the same systems to survive that an 'off-grid' unit does, along with enhanced clearance and more aggressive tires to negotiate uneven terrain as well as an underbelly enclosure to keep out dust and debris. So, there is a difference between the two, but right now we tend to use the terms interchangeably."

A case in point might very well be No

Boundaries' new 10.8. Essentially an open-framed unit with a rooftop tent, 40-gallon freshwater capacity, flexible solar panels, outdoor kitchen and Goal Zero Yeti 1500X Portable Power Station, the 10.8 is expressly designed to carry motorized toys — up to and including a four-seat Polaris RZR ATV. To the consumer, it appears for all the world as if it was designed for off-road use. And it most assuredly can be — but Schade sees it as an off-grid platform.

Meanwhile, the new IBEX carries similar equipment and also sports all-terrain tires, increased ground clearance and heated and enclosed under-

belly. Call it "off-road" capable. See what we mean?

Currently, the biggest inroads to off-grid performance are being underwritten by manufacturers of more expensive fifth wheels that can absorb the quest for new technology before it "trickles down" to more affordable units. And that usually revolves around solar power.

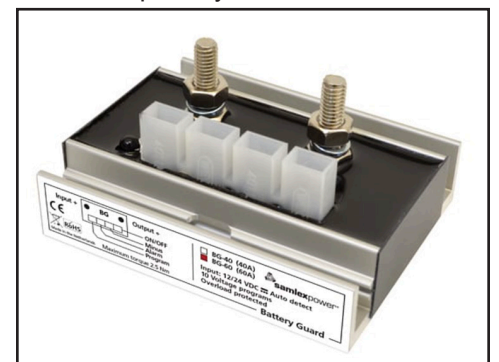
Keystone RV Co., for instance, initially made its Super SolarFlex off-grid package available a few years back on Montana, Raptor and Fuzion models. At the time, it was a \$20,000 upcharge and included four 250-watt solar panels for a combined 1,000 watts of solar collection. For the 2022 model year, the Goshen, Ind.-based subsidiary of Thor Industries Inc. announced all its brands will come factory-equipped with one of four SolarFlex packages. They range from 200 to 1,200 watts of power, with increasingly advanced support components, and retail for between \$450 and \$19,500.

And Keystone isn't alone in its quest for off-grid performance, by any means. At November's SEMA Show in Las Vegas, Middlebury, Ind.-based Grand Design RV Co. announced a partnership with Volta Power Systems that will offer buyers of 2022 Momentum toy haulers and other Grand Design products optional systems ranging from 6kWh (6,000 watts) and 3,200 watts of AC power to a massive 18kWh of power.

Jayco, for its part, unveiled its Overlander EXT Modular Power Management system in September. Developed in conjunction with Renogy and Dehco Electronics, the package includes six Renogy 200-watt monocrystalline solar panels, six 12-volt 100AH lithium batteries (for 7.2kWh of stored power), a 3,000-watt pure sine wave inverter charger (with 50-amp bypass), a 100-amp charge controller and a 600-amp battery monitor. It will be offered as an option on 2022 North Point and Pinnacle fifth wheels and Seismic and Seismic Alpha toy haulers.



AM Solar master technician Alvin O'Daol checks final connections on an 850-watt solar system installation added to a Grand Design Imagine travel trailer. Photo by Chris Hemer.



Samlex America Battery Guard



Go Power! Duralite 100-watt solar kit

Go Anywhere

What's made solar the buzzword of the moment? Affordability, clean power and "go anywhere" freedom.

Samlex America's Jonathan Krawchuk concurs.

"When the company first started offering solar, it was quite expensive and was kind of a luxury to have a solar system on your RV," he said. "Now, it's a lot more mainstream — it's on the roofs of houses, on RVs, and those economies of scale have brought the pricing down to where it's much more approachable to the everyday person. And people now understand it. It's not just some exotic product used on the space station."

Having cut its teeth on building power products for commercial and industrial markets, Samlex expanded its product offerings — which now include converters, inverters, chargers and power supplies — and its reach. The Samlex Solar brand was introduced in 2009 for the RV, marine and off-road markets, and the company offers everything from 10-watt battery maintainers and portable kits to its new 200-watt solar charging kit, which Krawchuk said is "the largest single solar panel in 12 volts that's offered in the RV industry." The Samlex lineup also includes the Battery Guard, which will cut off the battery power before it drops to the point where it can damage the battery — a critical drawback of flooded lead-acid, gel and AGM batteries.

Then, too, the solar industry has made dramatic inroads in the amount of power that can be generated and stored.

"Before, it was more a matter of 'let's keep our batteries healthy,'" said Garret Towne, president of AM Solar. "Systems were a lot more basic — and, because of that, more popular with smaller RVs. Now, the technology exists to take a 40-

foot fifth wheel off the grid for a week. When I first started, the biggest jobs we'd ever do cost about \$20,000," he said of the custom outfitter. "Now, we're doing \$20,000 jobs regularly — and have even had some that were more than \$50,000."

For most RVers, such systems are well out of the norm. While "starter systems" that include a 110- or 120-watt panel and an inverter are fast becoming the norm with factory-installed solar and work well to keep the battery topped off for a weekend while offsetting 12-volt DC loads such as lights, fans, water pumps and slideout motors, many solar suppliers recommend a slightly more robust package to truly enjoy life off the grid. For example, Eva Mitic, marketing manager for Go Power!, a British Columbia-based company that's celebrating 25 years of providing solar components — and one million panels sold — notes that the company's most popular kit, the 190-watt Overlander (about \$800), is easily capable of maintaining battery loads, but recommends its 380-watt Solar Elite Charging System for extended weekend use. Paired with a 2,000-watt inverter and a 200-amp/hour lithium battery bank, such systems will run virtually everything in an RV, including limited microwave use, and is buildable.

"A complete 380-watt system would cost about \$4,000," Mitic said. "Most campers would recoup that investment in less than two years by not having to rent an expensive campsite with hook-ups."

In fact, Go Power! perhaps best illustrates the "mainstreaming" of solar systems in the RV space. Offering a "soup to nuts" approach to solar power generation by engineering all of its system components from panel to battery, the company — along with Bend, Ore.-based Zamp Solar — recently became part of the growing Dometic family of RV and outdoor equipment companies.

Determine Your Power Needs First

While a half-dozen 200-watt roof-mounted solar panels might earn you bragging rights at the next campground get-together, "going big" isn't always necessary.

"People always want to ask, 'how many panels is it gonna take to run my coach?'" said Chris Greer, vice president of product development for WAY. "Our take to that — and it really needs to be everyone's response — is, let's talk about the whole system because it's not just the solar panels. It's also the kind of battery bank you're running, what kind of inverter or converter charger you're running and what devices do

you want to be able to use while you're camping? You have to have a conversation about the entire setup — and that really opens a lot of people's eyes because they think well, I just need throw some panels on the roof and my coach is automatically ready to go off grid. That's just simply not the truth."

As Greer noted, power demands vary, depending upon the size of the RV and the needs of its occupants — be it a stick-and-tin travel trailer, high-end fifth wheel or motorhome — but did offer some advice.

"A good starting system, in my opinion, would include a bare minimum of 200 amp-hours of battery power, 360 or more watts of solar panels on the roof and then 2,500 to 3,000 watts of inverter power. That will give you some camp time. You can't sit there with the air-conditioner running endlessly, but you can watch TV, run a computer and your refrigerator — achieve some of those basic camping functions and still have some creature comforts. If people really want to boondock, they need to invest in a system."

WAY, an Elhart, Indiana-based distributor and manufacturer, has been involved in off-grid product development for years. The company pioneered 12-volt DC refrigeration and in recent years has invested heavily in solar and its related components, including partnering with RELION Battery, a leading manufacturer of lithium-iron phosphate batteries across many applications.

"We offer a couple different options," Greer said. "The most popular is a rigid glass-panel design. Panels are made of either monocrystalline or polycrystalline, but a mono panel in the glass style is more efficient than a poly. The next step up — and we offer these, as well — is Merlin Solar flexible-style panels, which add another bit of efficiency over even the monocrystalline glass panel. They are probably 15% more efficient than the standard glass panel of the same size."



AIMS Power 200Ah lithium ion battery



A bank of Battle Born LiFePO4 batteries

“From a charge controller standpoint, an MPPT (maximum power point tracking) unit is the type of charge controller you want to use if you’re truly trying to boondock because they are more efficient. I know that many customers still use a PWM (pulse width modulation) charge controller, but that’s more of a cost decision than anything else.”

Let’s Talk Batteries

All the solar panels won’t do you any good without a means of storing the energy they produce. At Dragonfly Energy, purveyor of Dragonfly Energy (OEM) and Battle Born (aftermarket) batteries, the company isn’t just focused on the cell chemistry of “clean power” of solar for the RV arena, but also the manufac-

turing process. Designed and assembled in Reno, Nevada, Battle Born is also developing a system to utilize a solid electrolyte instead of liquid. That, said company representatives, means its All Solid State Batteries (ASSB) will be lighter, smaller and completely non-flammable.

The first step any camper should make, noted a company rep, is to switch to lithium from lead-acid construction. Comparing its 100Ah 12-volt battery to a 200Ah lead-acid unit, lithium offers a number of benefits. For starters, it can be discharged to 100%, an act that’s the kiss of death to lead-acid units. Self-discharge rates when not in use also differ dramatically: 2-3% per month (lithium) versus an average of 33% for lead-acid 12-volt batteries. There’s also a substantial weight difference — 31 pounds as opposed to 144 pounds — but the real savings are in dollars. While the biggest hinderance to widespread lithium ion battery use in RVs is initial upfront cost — a single 100Ah 12-volt lithium battery will cost two to three times that of its lead-acid counterpart — they will actually save money in the long run. The battery life of a lithium unit is 3,000-5,000 cycles, compared to 500-1,200 for a lead-acid



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battery. And, the rep added, lithium batteries perform significantly better than lead-acid units at low temperatures.

One of the newer companies in the RV solar arena, Aims Power in Reno, Nev., actually has one of the deepest pedigrees in solar off-grid power generation, having built systems for commercial, NASA and military use. Founded by Bruce de Jong, the company also has the capability to manufacture a specific inverter size for OEM requirements — and has every component in the Aims Power solar products and kits, including its proprietary battery brand, manufactured to its own specifications. While speaking with *RV Enthusiast*, he warned installers to exercise their due diligence when developing a solar system — especially when it comes to batteries.

“There are a lot of battery technologies available,” de Jong said. “But not all batteries are equal, and not all batteries called ‘new’ actually are new. For example, some are using recycled Nissan leaf batteries or other old vehicle-returned batteries — and the voltage levels aren’t quite the same. So they’ll usually advertise fewer cycles. A new lithium-iron phosphate battery should be capable of 3,000-5,000 cycles, but a lot of companies (on the Internet) will advertise 1,000-2,000 cycles — basically, because they’re used batteries. So the defect rate is going to be much higher, but also the voltage levels are lower so you’re not getting a good charge on them — and most converters and charger aren’t going to work properly with them.

“The batteries are always a limitation to the system,” he added, “so if you limit them further by not charging them properly, you’re setting yourself up for disappointment.”

And while contemporary systems tend to be of the 12-volt DC variety, as more power is needed the systems themselves increase; going beyond 3,000 watts, in the opinions of many suppliers, usually means increasing to a more sophisticated 24-volt DC system. But that requires more knowledge.

Fortunately, many suppliers also have operations in place that make technicians and even engineers available to consumers to assist them when questions crop up. For example, Xantrex — which recently released eGEN Max, an enhanced version of its eGEN system that integrates with the motorhome’s power system and automatically turns on the engine when the battery needs to be charged, eliminating the use of a generator — offered a series of free webinars this year to pro-



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vide technical information on solar and generator-free systems. Others offer learning centers and support online.

And, while some might consider actual hands-on training to be overkill, it's available. According to Todd Henson, director of education for the Athens, Texas-based National RV Training Academy, the popularity of solar led the NRVTA to double its hands-on classes dealing with solar installations. "We've had a ton of interest," he acknowledged, "and now offer two classes per cycle — and are already booked up four months out." And not all of those seats are being occupied by dealer service technicians.

Beyond the constraints of an outdoor

hospitality industry seeing record numbers of new RV owners in its space, the popularity of solar also is fueled by younger campers looking for alternatives to a lifestyle with a shore power umbilical cord attached.

"We're seeing a different type of consumer than we did just 10 years ago," said Wayne Kaylor, CEO of Elkhart, Ind.-based RV distributor WAY. "There are a lot of younger people coming into it who have a different 'take' on the outdoor lifestyle — they don't just want to 'go camping' like their parents did, with neighbors parked five or 10 feet away.

They really want to get away and enjoy the outdoors.

"I think there will always be 'traditional' campers," Kaylor added, "but I also believe the industry will continue to move in the direction of building RVs that won't require hookups to be fully self-sufficient."

*Interested in solar power? So is RV Enthusiast! Watch for its April issue, where we will take an even deeper look at the growing boondocking trend — and the products that help to make it happen. **RVE***



Most suppliers of solar systems to the aftermarket include a wealth of information on their company websites to discuss and demonstrate various systems and components. This overview of onboard products is found at wayinterglobal.com.

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Stopping on a Dime



Towing heavy trailers and fifth wheels requires lots of engine “grunt” — but stopping performance is even more important. Converting from stock drum to disc brakes adds a big dose of safety.

By Bill Gehr / Photos by Bob Livingston

Pulling a heavy fifth wheel or trailer requires additional driving prowess to maintain safe journeys. Braking distances will be longer, so making sure there is plenty of room between you and traffic is critical. But even when anticipating problems, sometimes the element of surprise rears its ugly head — especially when traffic comes to a sudden halt or another driver cuts you off.

Electric/drum trailer brakes help, but there are limitations, especially if the trailer is loaded to excess. That's where disc brakes shine, and fortunately, Kodiak Brake Products has aftermarket kits that allow owners to make the conversion to disc brakes with superior stopping power.

Why make the switch? Well, standard electric drum brakes have changed very little over the years and, in fact,

the best brake-lining material — asbestos — was banned years ago due to its health hazards. Today the brake-parts industry uses more environmentally friendly (but less effective) shoe material, which just can't compare to disc brakes when in extreme stopping conditions — or, for that matter, even during regular stopping maneuvers.

Electric drum trailer brakes also have more moving parts than their disc counterparts and, frankly, the electromagnetic mechanicals are not as precise as self-adjusting disc brake calipers. There are self-adjusting electric drum brakes on the market (see “Slowing Down Safely,” *RV Enthusiast* July 2021 issue), but disc brakes provide more equal braking at each wheel and better performance. That's why the automotive industry transitioned to disc brakes many years ago.

Other important factors to consider

when deciding on the benefits of a conversion are that disc brakes are not affected by water or rust and are extremely fade-resistant on those long downhill grades, which is ideal for anyone towing a heavy RV. Plus, brake pad life is usually pretty decent.

Kodiak offers various disc-brake conversion kits designed for axle ratings up to 14,000 pounds, although most trailers and fifth wheels have axles rated up to 8,000 pounds. The company's Dacromet coatings are designed for all types of climates your RV might live in — including coastal areas where rust is a serious problem. The coated rotors minimize the corrosion between the rotor hub face and the wheel face. Areas with high humidity can also wreak havoc on moving parts, so material quality is very important. Stainless-steel components are also offered, but these parts are more expensive and usually



1

Installing the Kodiak disc brakes will take the better part of the day. Make sure the trailer and axles are properly secured with jacks and stands before working on the brakes. After disconnecting the power wires from the electromagnet, the stock drum brake components are removed from the spindle.

only used on boat trailers.

For this project, a kit for 7,000-pound axles was installed on a 38-foot fifth wheel with a gross vehicle weight of 16,000 pounds. The retail prices for the kits vary, but the kit for two 7,000-pound-rated axles, 9/16-inch bolts, 8 lugs on 6 1/2 inches and Dacromet coatings runs around \$420 for each axle. Prices will also vary for the brake line kit, depending on length, but figure on about \$200. It's best to shop the Internet for best prices and availability.

Unlike electric brakes, hydraulic disc brakes require an electric-over-hydraulic actuator. This piece of equipment routes the pressurized hydraulic fluid via a signal from the brake controller to the calipers in response to the braking of the tow vehicle. For this project, we elected to install an ActaLink Model ACT1600 trailer brake actuator from Tuson RV Brakes for controlling the disc brakes.

The ACT1600 (MSRP \$850) is rated at 1,600 psi and is one of the best actuators on the market. A big selling point is the bypass system, which limits pressure on the brakes when stopped for longer periods of time (foot on the pedal). It bypasses at a lower pressure, which helps improve brake system longevity. It also has incredibly fast response time and allows for shorter stopping distances. It meets all DOT requirements. The gold-toned box measures only 14 inches long, 4 inches wide and 6 inches high, which makes it easy to mount in a front compartment.

It's best to mount the actuator in an area where the fluid reservoir can be accessed easily and monitored. However, the reservoir is quite large, making fluid replenishment less frequent.

The ACT1600 is compatible with most OEM integrated brake controllers, but really shines when paired with the company's DirecLink NE brake controller. When connected to the DirecLink controller, the system monitors fluid level, temperature and low/high current. It's best to check with the company to establish exact compatibility, although

we have used this actuator on Ford and Ram trucks with integrated brake controllers.

Installation of the Kodiak disc brakes and the Tuson actuator can be accomplished by most experienced do-it-yourselfers and will take the better part of a day to complete. The process begins with selection of the brake actuator's location, keeping in mind that shorter brake lines to the calipers will provide faster response times. The only choice for locating the actuator in the Carriage Cameo 36-foot fifth wheel was in the front compartment, slightly more than 16 feet from the front axle. The batteries were in close proximity, providing a short run to supply 12-volt DC to the actuator, and the rest of the wires for connecting the brake controller were also nearby.

The next step was to lift all four tires off the ground at the frame (supporting the axles with floor jacks and the chassis with proper size jack stands). After the tires and wheels are removed and set aside, the wires are cut and the stock hub/drum and backing plate assemblies are removed.

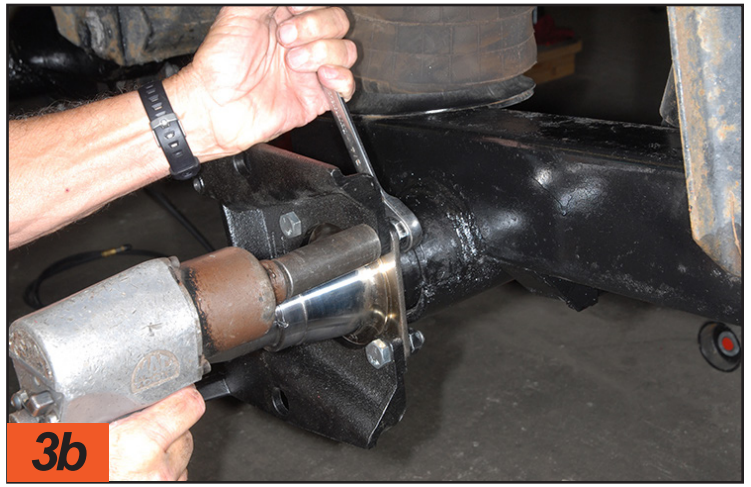
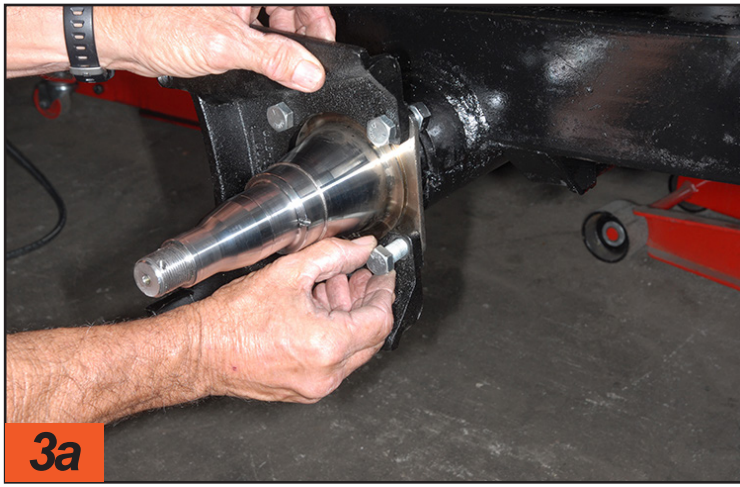
Once the old brake components were removed, the caliper mounting brackets were installed, paying close attention to the position of each one: three o'clock on the left side and nine o'clock on the right side. The new hub and rotor assemblies install fairly easily, although we had to do some grinding on one of the brackets to make everything fit perfectly. Also, you'll be replacing the bearings and packing them with grease during the process.

When everything was in place, the



2

Make sure the spindles are cleaned thoroughly with a solvent and shop rag before installing the new components.



The caliper mounting brackets are positioned and bolted on to the axle. The brackets on the left are in the 3 o'clock position, while the ones on the right face toward 9 o'clock.

rotors were spun several times to ensure that they moved freely, then we rechecked the spindle nut for proper tightness according to manufacturer's specifications. When installing the calipers, the fluid bleed fitting must point up, and the mounting bolts are torqued to 40-50 foot-pounds.

Installing the brake lines from the actuator to the axles will require custom routing, and it's important to allow for any axle flexing while on the road. All of the brake lines were permanently mounted and protected from rocks or debris that can be thrown from the tires.

Once the system was inspected for proper fit and the brake line connections were double-checked, the Tuson actuator reservoir was filled with DOT 3 brake fluid and any air was bled from the system. This process starts at the

caliper farthest from the actuator, using the bleeder fitting. It's best to use a small clear vinyl hose and a clear bottle filled partially with fresh brake fluid to capture fluid/air being pushed out of the system. This allows you to see when the bubbles stop, indicating that the air is purged from the brake line.

To complete the bleeding procedure you will need a helper to activate the tow vehicle's brake controller, which will run the actuator and pressurize the brake lines. We used cell phones (on the hands-free speaker) as a way to communicate back-and-forth with each other during this process rather than relying on a walkie-talkie, which needs to be manually activated by hand. With the actuator running and the bleeder fitting open, count out 5 to 10 seconds, then close the bleeder and

stop operation of the brake control.

Another simple way to activate the actuator is to have someone pull the breakaway pin on the kingpin box or A-frame and push it back in when called for by the person working the bleeder fitting. Do not let the actuator go dry or you will have to start the process over again. Repeat this procedure with the other three calipers. It's a little tricky, but very important, so be patient. Be sure to fill the fluid reservoir continually throughout this process and triple check all fittings for possible brake fluid leaks — and wear safety glasses, as brake fluid is not something you want in your eyes.

Re-install the tires and wheels and you're ready for the road. Before driving at normal speeds on public roads, manually engage the brake controller to test the brakes for function while moving forward slowly. Be sure to check the lug nuts and the brake lines after the first 50 miles and then again after the next 50 miles.

Ideally, new brake pads and rotors need a short break-in period for maximum performance. For the first two or three miles try to avoid heavy braking, which leads to higher rotor temperatures. Start your driving with four or five moderate braking stops from 40 mph while manually applying the brake controller. Let the brakes cool for 20 to 30 minutes before repeating harder stops. Next, complete four or five more aggressive braking stops from 40 mph. Again, let them cool for 20 to 30 minutes. After the break-in period, we towed the fifth wheel on various roads and steep grades to continue the break-in process.

The overall performance of the Kodiak disc brake conversion is astounding when compared with the fifth wheel's stock electric braking system.



Rotors are positioned on the spindles. Here 13-inch rotors with the Dacromet coating (to minimize corrosion) have 9/16-inch studs, eight on 6 ½-inch bolt pattern, typical of fifth wheel trailers in this size category.



New bearings are packed with grease and installed in the rotor. It's best not to reuse the old bearings. Re-install the washer and screw-on the castle nut.



The castle nut is first snugged down three times with enough pressure to seat the bearings. Back off the nut and snug to zero end play on the spindle. The hub and rotor assembly should spin freely and with no rocking side-to-side. Be sure to use a new cotter pin in the holes that line-up through the castle nut and spindle. After the tires are replaced, spin the wheels a number of times to check again for end play.

After close to 40,000 miles, the Kodiak system only required the replacement of one caliper because it developed a fluid leak. There are kits to rebuild calipers, but that job is usually reserved for professionals.

Once you've experienced disc brakes, you'll never own a trailer with electric drum brakes again. The powerful feeling of being able to descend long, steep grades with confidence and peace of mind — knowing you have almost no braking compromises — makes the towing experience much more enjoyable. At one point an errant driver cut us off without looking and we had to slam on the brakes to avoid a crash. Doing so resulted in a hard, controlled stop — in time — but we still had to check our underwear.



This hub uses a threaded dust cap, which can be replaced with a tool designed for this purpose, or large channel-lock pliers. These caps have an O-ring and should not be overtightened.



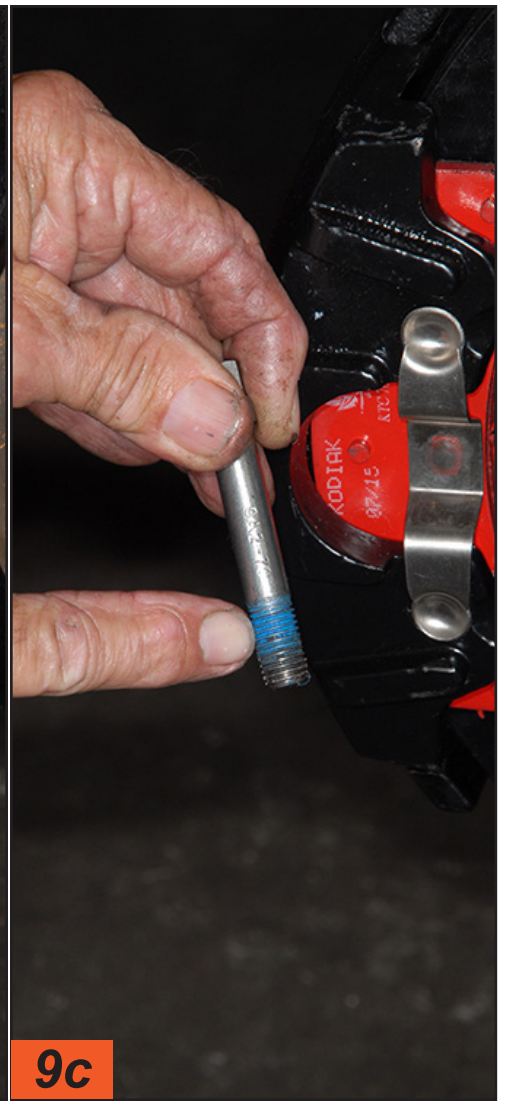
It was necessary to do some grinding on one of the brackets to make everything fit, which took only a few minutes. Obviously, making this conversion is not an exact science.



9a



9b



9c

After loading the pads, the calipers were placed on the rotors and bolted to the brackets. It took some gentle persuasion to tap the calipers in place. The hold down bolt is coated with blue thread sealer.



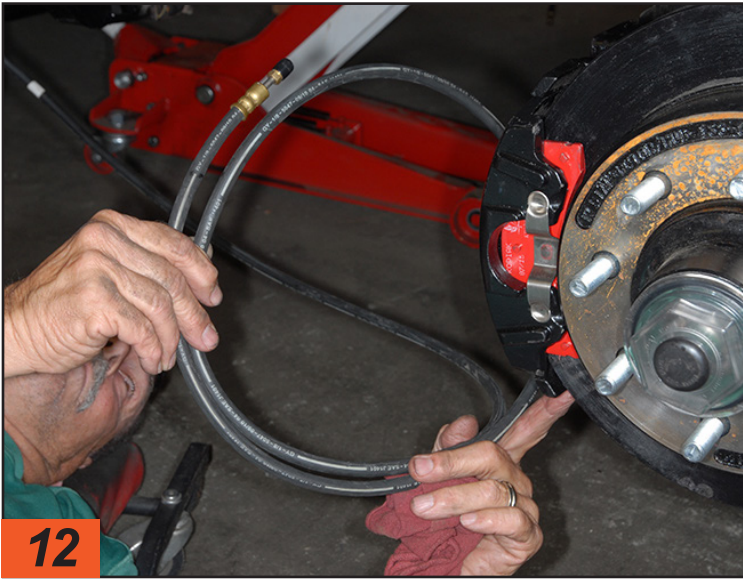
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The calipers are tightened, making sure the bleeder fitting is pointing upwards.



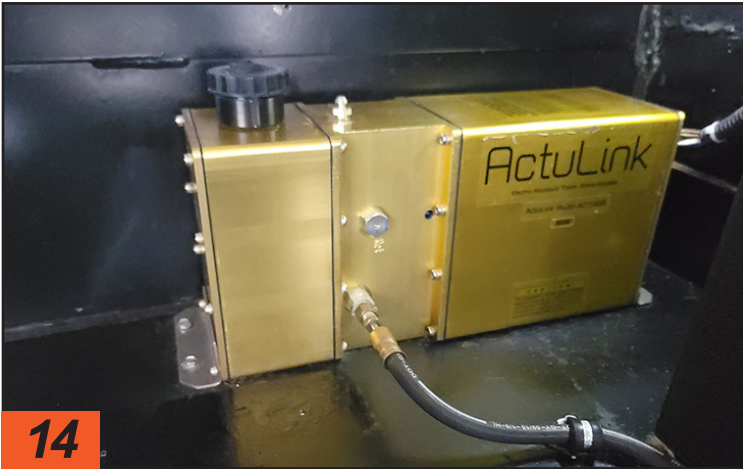
11

Once the new disc brake components were in place, it was time to route the hydraulic lines. Obviously, this requires crawling around under the trailer, so check the integrity of the jacks and stands before proceeding.



12

Hydraulic lines are routed from the actuator mounted in the front storage compartment to each wheel. It's important that these steel lines are properly secured on the trailer frame.



14

Tuson's ActuLink brake actuator was installed in the front storage compartment. This is one of the best actuators on the market and is rated at 1,600 psi.



16

The brake lines must be bled before putting the trailer on the road. Pulling the pin out of the breakaway switch is an easy way to activate the actuator during the bleeding process. Do not allow the actuator to run dry.



13

Rubber pigtails are connected to the steel hydraulic lines to provide the flex needed to move with the axles when on the road.



15

Make sure the fill cap for the oil reservoir is accessible and there is enough room to maneuver a bottle of brake fluid. Dot 3 brake fluid is used to fill the reservoir, which should be checked periodically.



17

To bleed the brakes, use a clear water bottle with a small amount of brake fluid. Cut a piece of clear tubing to a workable length and place one end in the bottle and the other on the bleeder fitting. While the actuator is running, crack open the fitting with a wrench and allow the fluid to run until the bubbles are gone. **RVE**

Sources:

Kodiak Brake Products

800-242-4882

kodiaktrailer.com

Tuson RV Brakes

800-968-8766

tusonrvbrakes.com

New Stuff!

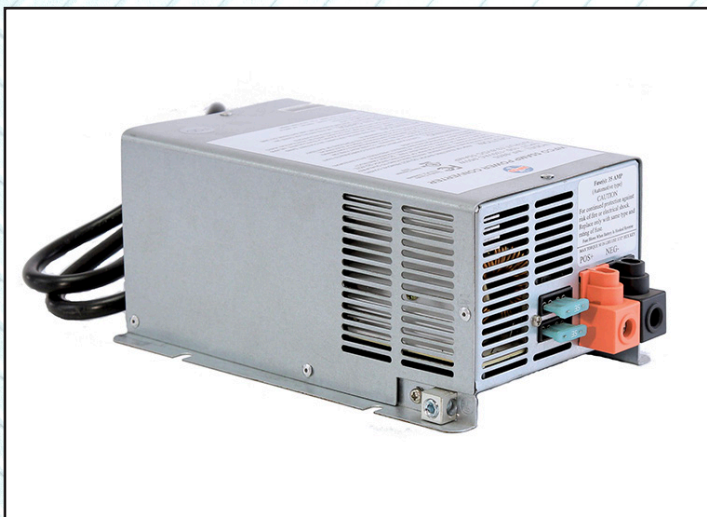
Adapting to Change

A baseplate and its tow bar are typically designed by the same manufacturer, making it inconvenient to mix-and-match brands to a vehicle towed behind a motor-home. As a result, tow bar manufacturers offer multiple adapters to allow fitment of their tow bars to a competitor's baseplate. Trying to determine the correct adapter can be frustrating — but with Roadmaster's new **Universal Tow Bar Adapter**, a Blue Ox, Demco or Curt tow bar simply pins onto late-model Roadmaster baseplates. The patent-pending adapter inserts into the Roadmaster baseplate and auto-locks in place when rotated 90 degrees. It takes less than 10 seconds to connect and requires no tools or hardware. **Roadmaster, Inc.** (800) 669-9690, roadmasterinc.com.



"X" Marks the Spot

Most fifth wheels are solidly built RVs, but even with strong jacks at all four corners, you'll feel it when someone else is walking around inside. MORryde's new **5th Wheel Stabilizer** utilizes a proven "X"-brace design to create a rock-solid platform even in strong winds. Designed in collaboration with Winfield Products, the stabilizer is said to be simple to install (in minutes), can be easily adjusted with its unique turnbuckle design and provides exceptional stability with enhanced lateral support. Plus, it remains in place during travel — no removal is necessary. **MORryde**, (574) 293-1581, morryde.com.



Intelligent Battery Detection

The popularity of boondocking has given rise to new battery technologies — and, now, a new means of maintaining them without having to replace a converter (or manually operate a switch) when changing battery type. **Auto-Detect**, from WFCO Group, uses patent-pending technology to detect battery chemistry and automatically change and optimize the charging profile. Its innovative processor system controls charging based upon the need of the battery, and Auto-Detect also provides continuous monitoring and improved fan control for quieter operation, better cooling and greater efficiency. **WFCO Group**, (877) 294-8997, wfcoelectronics.com.



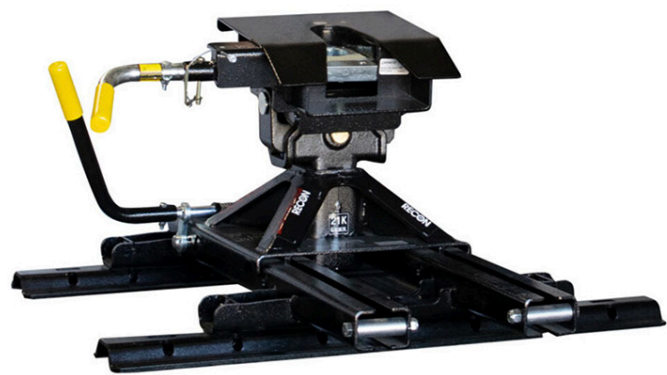
Chill Out — Outside

Many RVers tote around a portable fire pit for warming up the night air...but think nothing of suffering through triple-degree heat when having meals or conversations outdoors. The **Equator Advanced Appliances OAC 2000 Outdoor Air Conditioner** from Pinnacle Appliances is a low-noise, eco-friendly alternative when you need to cool off comfortably to enjoy a barbeque or family dinner outside: simply point the flexible duct in the right direction. The all-metal design won't rust or corrode, and the electronics inside are waterproof so you can stay cool and comfortable no matter what mother nature brings. This small (22.4 x 18.9 x 11 inches) unit provides 7,000 Btu of air-conditioning and features compressor overload protection and four locking casters for easy portability. **Pinnacle Appliances**, (866) 218-6902, pinnaclecombos.com.



The Hose Knows

RVers know to carry a dedicated hose for drinking water — but as many campers have discovered, not all hoses are created equal. Camco's **EvoFlex2** has the necessary size — 5/8-inch inner diameter — and a tough polyester outer fabric to maintain the hose's shape and protect it from breaks, cracks and leaks. More importantly, it's made of a lead-free, BPA-free and phthalate-free formulation so it won't leave a strong plastic taste in your water. It also features aluminum fittings with a molded strain relief, and its compact design allows for easy storage; a storage bag is also included. **Camco Manufacturing**, (800) 334-2004, camco.net/home.



Hitchin' a Ride

The latest model in Demco's Rekon fifth wheel hitch line, the **Rekon 21K Manual Slider** fits industry-standard rails and provides 14 inches of rearward travel and three height adjustments — 16-7/8, 18-1/8 and 19-3/8 inches — for level towing. Features include a lighter weight, two-piece design for easier installation and removal, built-in latch handle, wraparound jaw with lock bar for a stronger and more secure connection and a dual-articulating head design for easy hookup and release on uneven terrain. Available with or without rails. **Demco Manufacturing**, (800) 543-3626, demco-products.com.



Getting the Smell Out

Walex has long been known among RVers for its quality holding-tank treatments. Now, the company is offering a lineup of odor absorbers to neutralize odors in the air. Infused with a layer of charcoal, **Exodor Odor Absorber** captures and removes odors — it doesn't "hide" them behind a fragrance as air fresheners do — in spaces up to 300 square feet. The non-toxic, environmentally friendly and biodegradable gel product lasts up to 60 days. Available in 8-ounce Lavender and Orange Twist scents. **Walex Products Co.**, (800) 338-3155, walex.com.



Stepping Out in Style

When it comes to rolling stock, RVs don't have a lot of stylish options to choose from. Fortunately, Kenda Americana Tire and Wheel recently expanded its trailer wheel product lines with two new offerings for RV and marine trailers applications — **AM03** and **AM04** — that combine aesthetics with performance. The cast-aluminum wheels are available in six popular sizes and can be ordered in a variety of colors — including black, matte black, gunmetal, silver and chrome — to complement most trailers. The black wheels can also be ordered with surface-machined accents for a two-tone look. The benefits of the wheels also include corrosion-resistance and lighter weight. **Kenda Americana Tire and Wheel**, (574) 522-9450, americanatire.com. **RVE**

Spartan Intros 'No Jacks' Auto Leveling System



The Red Diamond Leveling system will be available for motorhomes built on the Spartan chassis such as Newmar.

Spartan RV Chassis recently introduced its Red Diamond Leveling System, an exclusive aftermarket option, that according to company officials brings quick and easy leveling to an RV — without the use of

jacks. This air spring leveling system is available for installation on model year 2000-and-newer Class A coaches built on a Spartan chassis and not already equipped with air leveling.

Designed to take the hassle out of

leveling while stationary and also while getting over bumps or under a low garage door, the Red Diamond Leveling System utilizes an innovative air spring and control panel setup. Controlled by a simple and intuitive touchscreen interface, users have a full suite of leveling functionality, including:

- One-touch automatic leveling;
- Manual leveling with control of each air spring while traveling at low speeds or while in park;
- Adjustable entry height to ease ingress and egress;
- Automatic protection against chassis twist.

The user-friendly touchscreen provides RV owners with easy control and selection of either auto-leveling or four-point manual control of the leveling actuators. Three digital "bubble level" indicators show the exact vehicle stance, and clear visual feedback on vehicle status is provided.

Cube Series Debuts Foldable Truck Camper



Truck campers are a great way to go off-grid — but they tend to add considerable weight to the vehicle, meaning owners of smaller pickups are out of luck, for the most part. Bend, Oregon-based Cube Series has come up with an ultra-lightweight folding camper that can be utilized by owners of lighter pickups such as the Chevy Colorado, Nissan Frontier and Ford Ranger.

Designed to fit on any standard small- or mid-sized pickup, the fully hard-sided folding camper is built of fiberglass, aluminum and composites and weighs in at less than 1,200 pounds. By employing a patent-pending technology, the units collapse to roughly a third of their "open" height. Power actuators put the two load-bearing walls up, then two interior walls are pushed

into place manually and locked.

Features of the \$33,827 camper include Gray Stone or Walnut Bark interior, wood-look vinyl flooring, leather-look 44-inch dinette, Olympic twin XL memory foam bed, 2-burner stove/sink combo, aluminum cabinet drawers, storage doors and Corian countertops. There's also an 18,000 BTU gas furnace, 1.7 cubic-foot built-in refrigerator, 1.0 cubic-foot

built-in microwave, three ceiling LED lights, four power sockets and four USB ports, Thetford electric flushing cassette toilet, plug-and-play solar panel, 7.5-gallon LP tank, exterior outlet and patio light, electric powered roof with remote, tankless water heater with outside shower and a 21-gallon freshwater tank.

The company, by the way, plans to introduce a towable version in the near future. The travel trailer, expected to retail for \$46,262, will stretch just 16 feet and weigh in at less than 1,600 pounds. For more information, visit cubeseries.com. **RVE**

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Exploring Montana's Great Falls

Following the footsteps of Lewis and Clark brings discoveries of how the West was expanded, while providing plenty of opportunities for photography buffs longing for wildlife and natural beauty



Rock ledges jut out along the River's Edge Historic Trail.

Many of you remember studying U. S. History in school and learning about the discoveries of explorers like Lewis and Clark, but did you know that you can actually walk in their footsteps in Montana? Great Falls is a city with a rich history, grand traditions, superb recreational and cultural amenities — and visitors can follow Lewis and Clark's portage route along the shores of the Missouri River.

Great Falls, the third-largest city in Montana, lies near the geographic center of the state, 90 miles north of the capital city of Helena on Interstate 15 — almost midway between the state capital and the Canadian border. The city straddles the Missouri River and was named for its close proximity to five waterfalls on this river, the largest being Big Falls (also now known as Great Falls). Over the years, dams have been built at the waterfalls, creating hydro-electric power for the city and surrounding county, which led to it being nicknamed "the Electric City."

To truly appreciate this area, though, a quick recap of your high school U.S.

history lessons is in order. The known history of Great Falls, Montana, dates back to the 1600s, when the Piegan Blackfoot Indians inhabited this area. The Blackfoot Tribe lived here for 200 years, until the United States claimed the area in 1803; the Great Falls area was part of the land included in the Louisiana Purchase when the U. S. bought the land from France. Just a year later, President Thomas Jefferson sent an expedition team captained by Meriwether Lewis and William Clark out to map the course of the Missouri River and to look for a river route to the Pacific Ocean. Included on the expedition team was a black man named York, a slave owned by William Clark; during the expedition's winter stay in the territory of the Mandan nation, they met (and added) French-Canadian fur trapper Toussaint Charbonneau and his Shoshone wife, Sacagawea, who served as an interpreter. She also provided significant assistance by identifying edible plants and making moccasins/clothing for the explorers.

The expedition team stayed at Fort Mandan through the winter of 1804-'05



A view of Big Falls, now more commonly known as Great Falls, are the highest of the five waterfalls on the Missouri River, rising 87 feet. One of the most famous paintings by Olaf Seltzer is entitled, "Lewis and Clark with Sacagawea at the Great Falls of the Missouri" was painted in 1927.



Giant Springs is the largest freshwater springs in the world, with water flowing from an aquifer in the Little Belts mountains.

and learned of the five waterfalls from the Mandan Indians. The expedition team reached these waterfalls in June 1805 and were the first white men to see these falls. Meriwether Lewis wrote in an unusual spelling-style about the waterfalls in his journal: "a sublimely grand spectile, a roaring too tremendous to be mistaken for any cause short of the great falls of the Missouri." The expedition team mapped out and portaged around these falls to continue its journey down the Missouri River.

The Corps of Discovery team's findings led to westward expansion and eventually to the development of Great Falls as a city. Great Falls lies on the Northern Great Plains of Montana and is surrounded by the Little Belts Mountain Range. Within a 30-minute drive from the city, you can reach the Little Belts mountains for a complete change of scenery. Big Baldy, the highest mountain peak, rising to 9,000 feet, is often snow-capped and is visible from Great Falls. Having the Little Belts

mountains nearby also offers visitors the opportunity to participate in skiing, snowshoeing, snowmobiling, hiking and caving activities. Showdown Ski Area, for example, is a popular family-owned ski resort within a short drive from Great Falls and has 640 skiable acres for all levels of skiers.

Visiting the waterfalls is a must-see activity. The Missouri River drops a total of 612 feet from the first to the last waterfall in a 10-mile stretch of the waterway. The first one is 26-foot-high Black Eagle Falls, named by Meriwether Lewis for an eagle that was seen nesting on an island at the base of the falls. The second waterfall going downstream, Colter Falls, is the smallest of all the falls, with a total height of just 6-1/2 feet. This small waterfall was named for John Colter, a member of the Lewis and Clark Expedition. Continuing downstream, the third site is Rainbow Falls, with a height of 44-1/2 feet. Rainbow Falls is one of the most beautiful of the five falls and was once known as



A small group of Pronghorn Antelope roam through Benton Lake National Wildlife Refuge. This 12,000-plus-acre refuge lies just north of Great Falls.

"Beautiful Cascade." The fourth, Crooked Falls (a.k.a. Horseshoe Falls), is 19 feet tall and is the only one without a dam. Big Falls (Great Falls) is the last waterfall downstream. Standing 87 feet high, Big Falls is home to the Ryan Dam, a six-unit hydroelectric power plant.

Most people who visit Great Falls seek out

views of the waterfalls, but this city is also known for having the largest freshwater spring in the United States: Giant Springs. Giant Springs State Park was established to preserve this area and averages 15.6 million gallons water-flow daily, with the water flowing from Madison Aquifer located in the Little Belts mountains. This freshwater spring has a constant year-round temperature of 54 degrees F and, in the winter months, creates "steam" above its surface. Next door, an active fish hatchery where a variety of rainbow trout and salmon are raised and its visitor center is open to the public with interpretive information and a viewing tank.

Uniquely, Great Falls is known for having both the shortest and the longest rivers. The Roe River, called the shortest river in the world, flows a short 200 feet between Giant Springs and the



The C. M. Russell Museum has one of the largest collections of this cowboy artist's paintings, sculptures and drawings. A sculpture of the artist himself, Charles M. Russell, stands in front of the museum that houses his work. The original log cabin that served as Charles Russell's studio is now part of the museum complex. Visitors can tour the cabin, as well as his original home, and the art museum.



The Lewis and Clark National Forest offers great outdoor opportunities, including a hike to these Memorial Falls in the Little Belts mountains.

Missouri River. Flipside, the Missouri River is the longest river (2,300 miles) in the United States.

There are several interesting cultural attractions that should be on your visit list. The Lewis and Clark Interpretive Center, built in 1988, sits on a cliff overlooking the Missouri River, closest to Crooked Falls. This interpretive center tells the story of the Lewis and Clark expedition from beginning to end. The center's exhibit hall's centerpiece is a two-story diorama of the portage of the Missouri River's five great falls. Admission fees are \$8 for adults; children ages 15 and under are free. There are historic walking trails nearby, including the River's Edge Trail, which runs 58 miles along both sides of the Missouri River and connects to several of the city's top attractions and parks. The historic River's Edge Trail is the main pedestrian corridor of the city and was designed to be enjoyed by walkers, joggers, rollerbladers and bicyclists.

If you are an art enthusiast, be sure to stop into the C. M. Russell Museum, featuring the works of famed cowboy and Plains Indians artist Charles M. Russell. The museum boasts one of the largest collections of Russell's paint-

ings, sculptures, drawings and illustrated letters. On the same grounds as the museum, you will also find Russell's original house and log cabin studio (the latter was designated a National Historic Landmark in 1965). The museum is open Thursday through Monday and one admission price (\$11 for seniors and veterans; \$4 for students) allows guests the chance to enter the museum, the original home and log cabin studio. A second art museum is the Paris Gibson Square Museum of Art. The city transformed a prominent piece of architecture into a museum in 1977, which features local, regional and international art exhibits on a rotating basis, ensuring something new to see with each visit. A unique sculpture garden can also be found outside this building. Admission to the Paris Gibson Square Museum of Art is free and it is open to the public Tuesday-Saturday.

Before leaving the city of Great Falls, be sure to see the Tenth Street Bridge. Built in 1920, this bridge is the longest open spandrel-ribbed concrete arch bridge in Montana. The concrete arched bridge spans the Missouri River and is a unique design that's not seen often these days.

Traveling north, just 12 miles outside the city of Great Falls you can also visit the Benton Lake National Wildlife Refuge. This refuge includes more than 5,000 acres of wetlands, attracting hundreds of thousands of birds and waterfowl every spring and fall. The refuge lies along the western migratory path for ducks, Canada geese, snow geese, tundra swans and thousands of shorebirds. There is a great nine-mile auto tour route through this refuge, allowing you viewing opportunities for wildlife observation and photography. Limited hunting and fishing are also permitted seasonally at the refuge. Admission to most national wildlife refuges is free, and they are open to the public usually seven days per week.

While traveling in central Montana, also plan a trip along the Missouri River

— and take the “Gates of the Mountain Tour” just an hour's drive south of Great Falls (go to gatesofthemountains.com for more details). This tour will take you on a boat tour following in the path of Lewis and Clark, who named the canyon “the gates of the rocky mountains.” As described in the journals of the Lewis & Clark Expedition, “The river is deep and between 100-150 yards wide, with the most remarkable cliffs that we have yet seen. These cliffs rise from the water's edge on either side perpendicularly to the height of 1200 feet. At each bend in the waterway, great stone walls seemed to block passage, only to open like gentle gates as the expedition drew near.” This area is said to be the “heart” of Montana, and you won't want to leave the state without experiencing this tour along the Missouri River. The two-hour tour costs \$16 (\$14 for seniors). Seeing the Gates of the Mountains was a highlight of our trip to the Great Falls area.

Given all that there is to see in Great Falls, you might want to spend several days in the area. There are two campgrounds in the city: Great Falls KOA Holiday (406-727-3191) offers large, pull-through full hook-up sites up to 80 feet; deluxe sites are around \$62.60 per night and deluxe sites with patios are \$100 per night; Wi-Fi is included. Dick's RV Park (406-452-0333) offers pull-through, full hook-up sites for around \$48 per night.

Lewis and Clark spent a long time in Montana. To truly follow in the footsteps of these famous explorers who traveled the mighty Missouri River, you should do the same. There's easily enough to see and do to fill several days and nights. **RVE**



There are many scenic locations along the 1,200-foot walls of the Missouri River in the Gates of the Mountains. The straight vertical walls almost appear to close in ahead of the boats coming down the river.

Suzanne Strauss



Suzanne Strauss and her husband, **Rich**, have been full-time RVers for about four years.

They started out camping on weekends in a pup tent; eventually, they bought a small single-axle travel trailer to “test the waters” and fell in love with RVing. Now living full-time in a motorhome, they ply the roadways in search of interesting and “off the beaten path” places. She can be reached at: RStrauss22@gmail.com



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