

Trip Report to Jerry Greer RV Dealership

Date: December 13, 2007

Destination: Jerry Greer RV Dealership
6700 East State Route 37
Sunbury, OH 43074

Participants: Dan Pearse, Vehicle Safety Engineer (Vehicle Research and Test Center - Defects Analysis Group)
Tim Cleland, Transportation Research Center (contractor in the DA Group)
David Disinger, Transportation Research Center (contractor in the DA Group)
Kevin, Technician (Jerry Greer RV Dealership)

Purpose: Examine an exemplar vehicle to compare to the complaint vehicle (Pasadena, TX), which had moderate brake drag after a heat soak. This heat-soak brake drag was described as “assumed to be normal” by the Bosch representative.

Background: The exemplar vehicle was a 2005 Model “A36” Windsport produced by Four Winds International, with Vehicle Identification No. 5B4MP67G653404225 and Serial No. WAA015198. An overall photograph of the vehicle is shown in Figure 1 in the Appendix with all of the photographs. The dealership sales “window sticker”, shown in Figure 2, labeled the frame of the vehicle as a Workhorse Chassis was a model W22 0-19.5 with a date of manufacture as January 5, 2005. The vehicle data placard, shown in Figure 3, lists the GVWR as 22,000 lb, the GAWR Rear as 14,500 lb and the GAWR Front as 8,000 lb. The vehicle had not been previously serviced. A sales brochure of a 2006 model year Windsport Class A motorhome is shown at the end of the Appendix (a 2005 model year brochure could not be located).

At the start of testing, the vehicle had 381 miles on the odometer. On the day these tests were conducted the sky was overcast with low clouds and a steady rain. The ambient temperature was 34 °F and the wind was from the southeast at 6 mph as measured at the Delaware airport, approximately 9 miles away and reported by undergroundweather.com from National Weather Service records.

Results: The vehicle was driven for approximately 7 miles and then stopped in a parking area to measure the temperature of the inner surface of the left front brake rotor with an Omega brand handheld infrared pyrometer Model OS533. The brake temperature was 240°F. The vehicle was driven approximately 3 more miles to the dealership and the brakes were applied somewhat aggressively several times before pulling into the repair bay.

The vehicle was raised in the front with a hydraulic jack and in the rear with the onboard leveling jacks. The wheels were turned by hand with the transmission in neutral and the parking brake off. All four wheel-ends were “easy” to turn. The rear wheels had slightly more resistance to turn as was expected due to the drivetrain. The hubcaps were removed and a VRTC-made torque-measuring crossbar was installed. The crossbar, shown in use in Figures 4 to 6, has four 33-mm sockets mounted in machined cylinders at the wheel “bolt circle” (there are actually 8 lug nuts, but only 4 were needed for this test). There is also a 1/2-in drive socket receiver in the center of the crossbars that connect the sockets to attach a beam-type torque wrench with a tattletale pointer to record the maximum torque measured.

The temperatures of the inner surface of the brake rotors were measured as the wheels

were turned with the torque wrench. The temperatures at the time the torque measurements were made were RF: 280°F, LF: 300°F, LR: 119°F, and RR: 134°F. The torques required to rotate the wheels were measured at RF: 5 ft-lb, LF: 8 ft-lb, LR: 40 ft-lb, and RR: 43 ft-lb. When turning the wheels by hand, they seemed to spin very easily compared to the Pasadena, TX vehicle, although these torques were not measured on the TX vehicle.

The hubcaps were left off the vehicle and it was driven again on a shorter route with more braking. The vehicle was quickly brought back into the shop and raised. The temperatures were RF: 241°F, LF: 290°F, LR: 230°F, and RR: 240°F. The torques required to rotate the wheels were measured at RF: 5 ft-lb, LF: 5 ft-lb, LR: 20 ft-lb, and RR: 20 ft-lb. The decreased rear torques may be due to the differential fluid increasing in temperature from use.

Recommendations: Continued participation in the joint Workhorse/Bosch field inspections is the best solution to resolving this problem, and the new wheel torque measuring crossbar will be another tool to document the heat-soak brake drag.

Daniel G. Pearse

Vehicle Safety Engineer
Defects Analysis Group
Vehicle Research and Test Center

Photographs

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Acronyms

DA Group	Defects Analysis Group at the Vehicle Research and Test Center
°F	Fahrenheit scale of temperature measurement
GVWR	Gross Vehicle Weight Rating
GAWR Front	Gross Axle Weight Rating Front
GAWR Rear	Gross Axle Weight Rating Rear
IR	Infrared pyrometer
LF	Left Front
LR	Left Rear
ODI	Office of Defects Investigations
OH	Ohio
RF	Right Front
RR	Right Rear
RV	Recreational Vehicle
TX	Texas
VIN	Vehicle Identification Number
VRTC	Vehicle Research and Test Center
VRTC-DA	Vehicle Research and Test Center - Defects Analysis Group



Figure 1 - View of the Exemplar Four Winds International Windsport



Four Winds International
701 CR 15
PO Box 1486
Elkhart, IN 46516-9731

Serial Number: WAA015198	Product Year: 2005	Interior Color: Hoya Sand
VIN: 5B4MP67G653404225	Product Chassis: W22 0-19.5	Exterior Color: Taupe Mist Metallic Graph
Order Number: 0037265	Date Manufacture: 01/05/2005	Cabinetry: Maple

36A Windsport	Base Price: 111,090
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STANDARD EQUIPMENT

10 Gallon Gas/Electric Ignition/Water Heater	13.5 BTU Rear Roof Air Conditioner
13.5 BTU Roof Air Conditioner	20" Flat Screen Color TV Bedroom
27" Flat Screen Color TV - Front	3 Burner H.O. Range W/Oven
35,000 BTU Furnace	50 Amp Service
5000 lb. Hitch	8 Cu. Foot Refrigerator
AM/FM Radio/CD Player - Bedroom	Automatic Electric Double Step
Cable TV Hookup	Dash Fans
Day/Night Shades	Deadbolt Entry Door Lock
Detachable Power Cord	Ducted Roof Air System
Enclosed/Heated Holding Tanks	Exterior Roof Ladder
Factory Cruise Control	Factory Installed Awning
Fog Lights	Front & Rear Fiberglass Caps
Heated/Remote Exterior Mirrors	HWH Hydraulic Jacks
LP & CO Leak Detectors	Microwave Oven
One Piece Rubber Roof	One-Stop Interior Systems Center
Outside Shower	Rotocast Exterior Compartments
Skylight	Slide-Out Pantry
Telephone Jack	TV Antenna
Upgrade Quilted Mattress	Vanity with Chair
Water Heater By-Pass Kit	Wheel Liners
XM Satellite Ready AM/FM Radio/CD Player	

OPTIONAL EQUIPMENT

One Touch Automatic Acrylic Patio Awning - Graphics Only	\$2,093	6 Way Power Driver Seat	\$455
Round Dinette Table w Chairs	\$973	Convenience Package	\$490
Premium Plus Package	\$8,610	RVA Seal	\$105

Gel Coat Fiberglass Exterior
 Solid Surface Galley Countertop
 Solid Surface Edge Dinette Top
 Cabinetry-Maple
 Home Theater System w DVD Player
 Back Up Camera
 5.5 Onan Generator
 Luxor Leather Hide-A-Bed Sofa
 Luxor Leather Driver & Passenger Captain's Chairs
 Luxor Leather Recliner IPO Barrel Chair
 Fantastic Fan
 Second Auxiliary Battery

Options Total: \$12,726

SK# 1793 Key - 34	Vehicle Total: \$ 123,816.00 Prep & Freight: 1,000.00 Total MSRP: \$ 124,816.00
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JGRV "Real Value" Price
\$106,094.00

Ship To: JERRY GREER RV'S

Jerry Greer RV
6700 East State Route 37
Sunbury, OH 43074
1-800-424-8289

Figure 2 - The Exemplar Vehicle "Window Sticker" Listing the Standard Equipment and Options

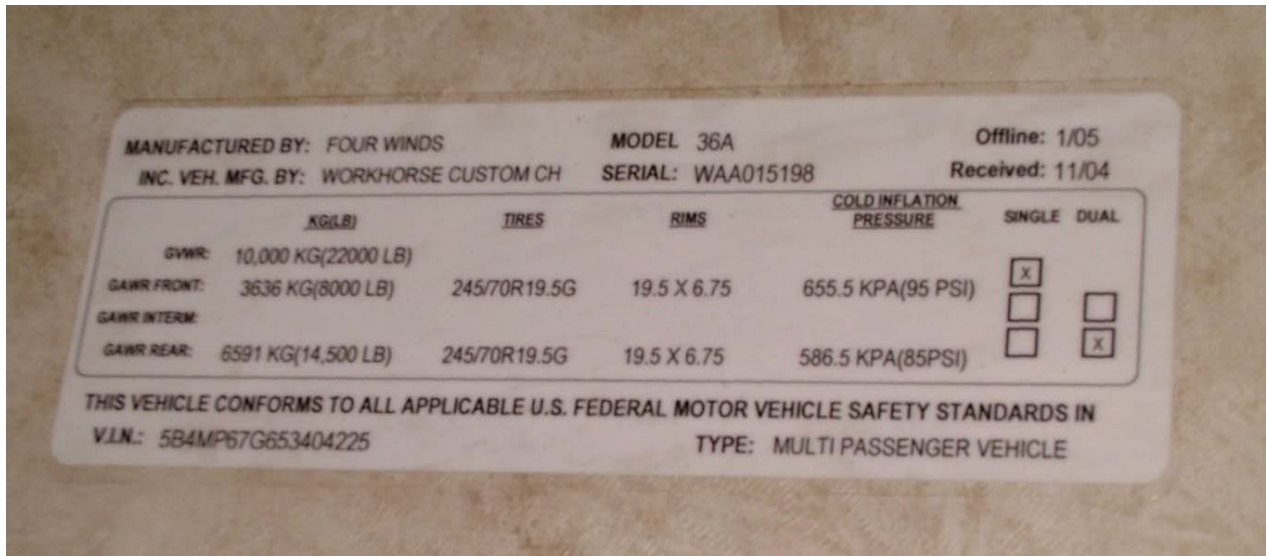


Figure 3 - The Vehicle Data Plate Lists the Vehicle Identification No., Serial No., Model No., Gross Weights, and Tire Pressures



Figure 4 - The Wheel Torque Crossbar and Beam-Type Torque Wrench in Use at a Front Wheel



Figure 5 - The Wheel Torque Crossbar and Beam-Type Torque Wrench in Use at a Rear Wheel

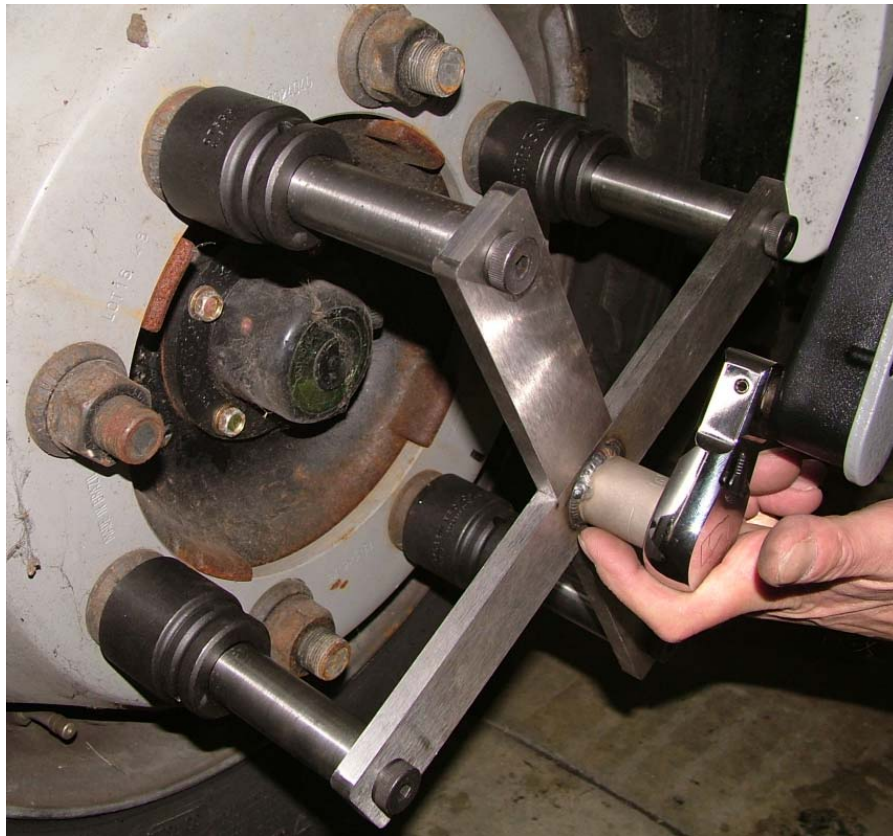


Figure 6 - Close-up of the Wheel Torque Crossbar

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WINDSPORT[®]
CLASS A MOTORHOME



FW
Four Winds
INTERNATIONAL

UNLOCK A WORLD OF TRAVEL POSSIBILITIES WITH WINDSPORT



Shown with Janus Steel interior, optional Maple cabinetry, optional Luxor Leather driver and passenger chairs, and recliner chair. The front overhead area features a 27" color television and ample storage cabinets on either side. The cockpit area is designed for maximum driver and passenger comfort, and features an oversized AM/FM radio with large buttons, compact disc and cassette player with weather band. A convenient computer hook-up (including a 110V outlet and phone jack), is located on the passenger side. The large panoramic windshield provides added driver safety.

Here is your chance to unlock a whole new world of travel possibilities in a Windsport Class A motorhome.

The Windsport surrounds you in a magnificent blend of world-class comfort and contemporary style. With a choice of innovative floorplans, exquisite interiors and distinctive exteriors—you'll find a model to meet your needs, tastes and lifestyle.

When you experience the Windsport, you'll see that nothing else will quite measure up. In comfort. In quality.



Shown with Janus Steel interior, optional Maple cabinetry and optional Luxor Leather hide-a-bed sofa. The sofa-dinette slide-out room dramatically expands your living area. The booth dinette easily converts into a bed when extra sleeping accommodations are needed.



Shown with Illustration Ebony interior, optional Maple cabinetry and standard refrigerator with raised panel inserts.

INTERIOR DECOR PACKAGES

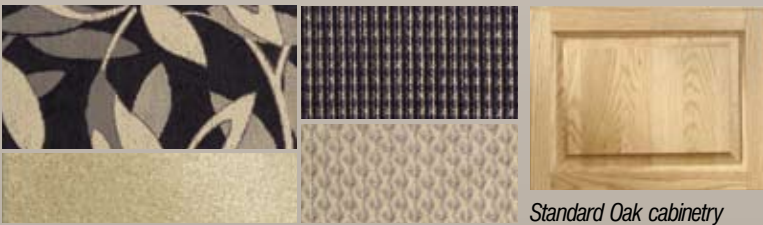


Illustration Ebony, Wheat carpet

Standard Oak cabinetry



Janus Steel, Wheat carpet

Optional Maple cabinetry



Tandem Taupe, Wheat carpet

Optional Cherry cabinetry



The standard slide-out pantry offers plenty of handy storage for almost any size food item. When closed, it holds all of the items securely in place—even when on the road.

All Windsport motorhomes feature a full 84" interior ceiling height, and are built to meet stringent high-quality standards—from the inside out. These models are available in single, double and triple slide-out floorplans.

For example, Model 34N features dual living room slides that dramatically expand your living area and accommodates a full hide-a-bed sofa. An optional vanity/sitting area is also available in the bedroom.

Model 36E offers dual zone living—with a comfortable living area in the front and one in the bedroom. It also includes two cozy leather Euro recliners in the bedroom. Model 36K features a spacious bedroom with king-size bed and a washer/dryer option.

All Windsport motorhomes feature a wide selection of upscale amenities from which to choose. You'll find a fully equipped kitchen with name brand appliances, and a comfortable living area perfect for relaxing after a full day of activities or entertaining guests.

A TRANQUIL ESCAPE FOR REST AND RELAXATION



Shown with Illustration Ebony interior and optional Maple cabinetry. Classic French bedroom door and window are available on Models 36A, 36E and 36K only.

The spacious bedroom can provide an escape from a busy day—with all the amenities for you to relax in comfort and privacy. Attractive bedroom appointments include a queen-size bed, inner spring mattress, color-coordinated bedspread and pillow shams.

There is plenty of cabinet and wardrobe storage to easily accommodate your personal belongings. The standard bathroom features a skylight in the shower, medicine cabinet with beveled glass door, neo-angled shower with glass shower door and china toilet.

A handy optional feature that is available in all Windsport motorhomes is the Convenience Package. It includes four two-way radios, a rechargeable hand-held vacuum cleaner, rechargeable flashlight, and valve stem extenders for easy access to fill your rear inner dual tires.



Shown with Illustration Ebony interior and optional Maple cabinetry. The vanity with upholstered chair and additional lounge chair is available on Model 36A only.

35W EASY ACCESS MODEL

Specially Designed For Individuals In Wheelchairs To Enjoy Luxury Motorhome Travel

The Windsport is available in a wheelchair accessible model. It is equipped with amenities and special features for comfortable living while on the road.

The entrance way features a rugged Braun hydraulic lift which is fully ADA compliant. The lift has a weight rating of 750 lbs., and is operated by a hand-held control that gently raises and lowers the lift. There is a manual back-up system in case of emergency. Side rails provide added safety. When not in use, the entire lift conveniently folds underneath the motorhome and out of sight—so it doesn't take up valuable floor space inside.

Extra-wide aisles make it easy to get around the motorhome. Galley features include an attractive free-standing dinette, lowered countertops,



convection microwave and three-burner gas range top installed in the base cabinet at wheelchair height for quick and easy food preparation.

The bedroom features a standard offset queen-size bed or optional twin beds with center aisle. The bathroom has a cantilevered vanity with skirt, raised toilet, and an oversized 44" x 40" roll-in shower with a floor-level threshold and easy-

ADDED CONVENIENCE FEATURES... A WINDSPORT PLUS



The Below Floor Utility Station is securely enclosed in a seamless Roto-Cast® storage compartment. It houses phone, cable, electrical and plumbing connections where they are kept protected and dry. Everything is clearly marked and simple to connect so set-up and tear-down is a snap.

Ample pass-through exterior storage compartment offers plenty of extra storage for large, bulky items as well as small personal belongings. The fully insulated, locking metal doors are easy to open, and ensure convenient, safe storage for your valuable belongings while traveling.



The standard One-Stop™ System Center houses commonly used switches and controls all in one convenient location. These include the systems indicator (shows holding tank and battery charge levels), water heater control switches, thermostat, generator control and hour meter, and slide-out control.

THE FOUR WINDS QUALITY DIFFERENCE

What sets Four Winds International apart from other manufacturers? It's our level of quality built into all of our motorhomes. It's the value integrated into all of our designs. It's a dedication to innovation so we can continually improve the quality and value of our motorhomes year after year.

Our ultimate goal is to build the right combination of quality, functionality and durability into each recreational vehicle for an extraordinary value. It's a commitment we take seriously, and one on which you can depend.

THE DIFFERENCE IS CLEAR

At Four Winds International, we strive to go beyond your expectations in every recreational vehicle we build so you can enjoy a better quality of life when traveling on the road.

All Four Winds motorhomes come with a full one-year, 15,000 mile bumper-to-bumper warranty, and a three-year, 45,000-mile limited structural warranty. Our nationwide dealer network is fully equipped and trained to meet your service needs. The experienced Four Winds support staff is available to provide assistance on all technical, service and warranty issues. See your Four Winds International dealer for complete warranty details.

Four Winds continues in our commitment to provide high-quality products and support services that results in customer satisfaction—one customer at a time. So whether you are a first-time recreational vehicle owner, or an experienced one, we want you to enjoy many years of adventures in your Four Winds International motorhome.

This is the Four Winds difference.

WHY THOR IS YOUR BEST RV VALUE

Thor Industries, Inc., listed on the New York Stock Exchange (THO), proudly traces its history back over 70 years to the pioneering days of the recreational vehicle industry with the founding of Airstream, the industry's oldest and most renowned brand. Our total commitment to quality and our philosophy of putting our customers first has led to our continuous growth.

Today, Thor is the largest builder of recreational vehicles. Thor's strong financial condition and years of solid growth are your assurance that we will be here to serve you for years to come. We think this extra peace of mind is important when 5

WINDSPORT EXTERIORS



Shown with Camel Glaze exterior paint option

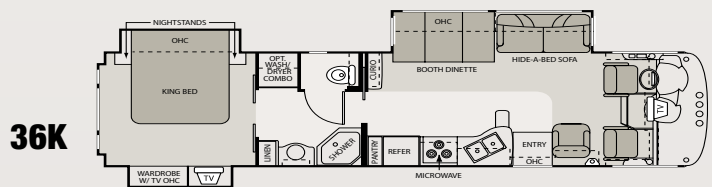
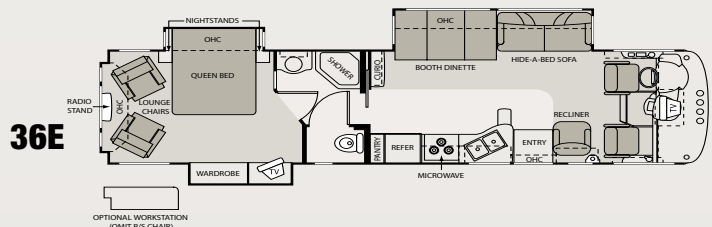
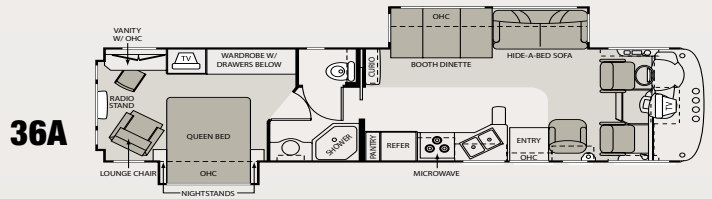
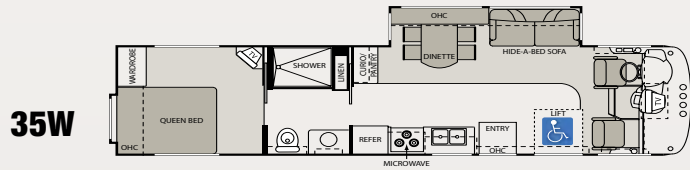
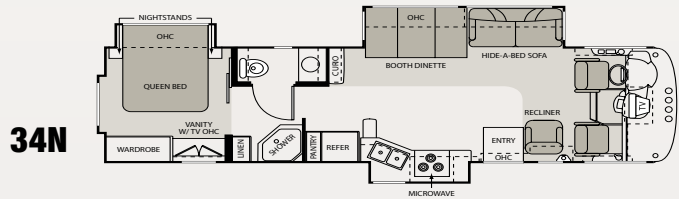
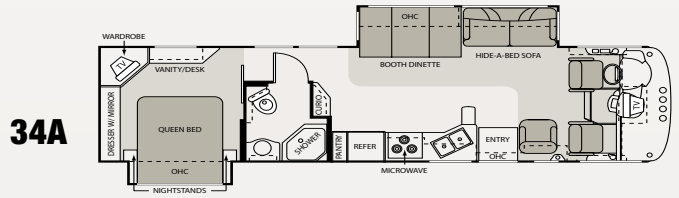
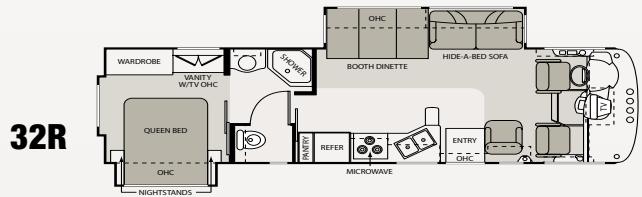


Shown with Taupe Mist exterior paint option

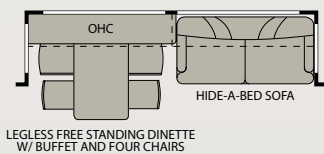


Shown with standard exterior graphics/paint package

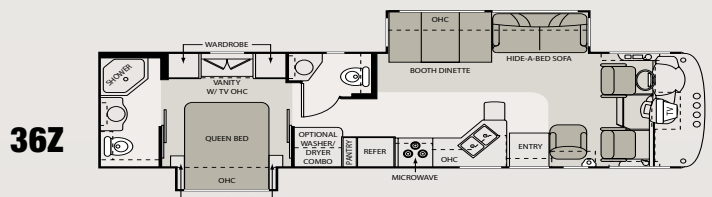
FLOORPLANS



Dinette Option



- Linoleum
- Carpet



Windsport Standard and Optional Features

BODY CONSTRUCTION/ EXTERIOR STANDARD

- 3" steel welded floor system
- Vacu-Bond laminated roof, walls and floors with high-density block foam insulation
- Fully welded tubular aluminum roof and sidewall cage construction
- Exterior graphics package
- Air conditioning ductwork molded into roof insulation
- Heated and enclosed utility station with full hook-ups
- Hydraulic leveling jacks and slide-outs
- Premium one-piece TPO roof—Energy Star approved and labeled
- Rubber tread entry steps
- Patio awning
- Roof ladder
- Exterior shower

OPTIONS

- Choice of exterior graphics/paint packages
- Seamless slick fiberglass exterior sidewalls
- Automatic electric patio awning

AUTOMOTIVE/COCKPIT STANDARD

- 5,000-lb. trailer hitch
- Dash fans
- Heated remote exterior mirrors
- Passenger side workstation with computer hook-ups including a 110V outlet and phone jack
- One-piece fiberglass front and rear caps
- Wheel liners
- Fog lights
- Back-up camera with audio
- Oversized AM/FM radio with large buttons, compact disc and cassette player, and weather band

OPTIONS

- Luxor Leather driver and passenger captain's chairs
- Six-way power driver's seat
- Spare tire with rim (not available on Workhorse chassis)

INTERIOR STANDARD

- Full 84" interior ceiling height
- Residential linoleum (galley, bath and entry way)
- Two 13,500 BTU roof air conditioners
- Oak cabinetry
- Raised panel wall cabinet doors with hidden hinges
- Hardware with Brushed Nickel finish
- Day/night shades throughout
- Soft Touch vinyl ceiling
- Fabric hide-a-bed sofa
- Attractive curio cabinet with glass doors (not available on 32R and 36Z)
- Flush floor slide-out (sofa/dinette)

OPTIONS

- Cherry or Maple cabinetry
- Dual pane windows
- Fantastic® fan in kitchen
- Leather hide-a-bed sofa
- Fabric recliner in place of barrel chair (not available on 35W)
- Luxor Leather recliner in place of barrel chair (not available on 35W)
- Leather Euro recliner with ottoman in place of barrel chair (not available on 35W)

GALLEY STANDARD

- 8-cubic-foot double door refrigerator with raised panel inserts
- 3-burner high-output cooktop
- Microwave oven (not available on 35W)
- Large Stainless Steel double bowl sink
- Slide-out pantry (not available on 35W or with 12-cubic foot refrigerator)
- Silverware tray
- Booth dinette with cup holders
- Free-standing dinette with four chairs (35W only)

OPTIONS

- 12-cubic foot side-by-side refrigerator with ice maker and raised panel inserts (not available on 35W)

- Convection microwave with 3-burner high-output range top (standard on 35W)
- Round dinette table with four chairs (not available on 35W)
- Solid surface galley countertop

ENTERTAINMENT STANDARD

- Cable television and satellite prep
- 27" television in front overhead
- 20" television in bedroom (not available on 35W)

OPTIONS

- Home theater system with DVD player and recessed ceiling speakers
- 14" flat screen television in bedroom (35W only)
- DVD player
- Satellite dish

BEDROOM/BATHROOM STANDARD

- Inner spring mattress
- Queen-size bed (not available on 36K)
- King-size bed (36K only)
- Bedspread and pillow shams
- Attractive headboard with sconce wall lighting (not available on 35W, 36A, 36E and 36K)
- Vanity with chair and one additional lounge chair (36A only)
- Classic French bedroom door and window (36A, 36E and 36K only)
- Two leather Euro recliners (36E only)
- Glass shower doors
- China bowl toilet

OPTIONS

- Twin beds with nightstand (35W only)
- Luxor Leather Euro recliner with ottoman in place of fabric recliner (36A only)
- Computer workstation in place of one Euro recliner (36E only)

SAFETY/CONVENIENCE STANDARD

- Entry door with deadbolt lock
- Telephone jack
- One-Stop™ Systems Center
- Smoke detector
- Fire extinguisher
- LPG detector
- Carbon monoxide detector
- Three-point seatbelts for the driver and passenger, and seatbelts throughout
- Washer/dryer prep (36K and 36Z only)

OPTIONS

- Washer/dryer combination (36K and 36Z only)
- Convenience package: 4 two-way radios, rechargeable hand-held vacuum cleaner, rechargeable flashlight and valve stem extenders

ELECTRICAL SYSTEMS STANDARD

- 5.5 KW Guardian RV generator
- 50-amp service
- Marine-type detachable power cord
- 10-gallon gas/electric water heater
- Water heater bypass system
- Second auxiliary battery

OPTIONS

- 5.5 KW Onan® generator
- 7.0 KW Onan® generator

STORAGE AREAS STANDARD

- Large pass-through Roto-Cast® storage compartments
- Deluxe heavily insulated aluminum compartment doors
- In-floor slide system allowing for full height storage compartments
- Heated and enclosed Roto-Cast® holding tanks

2006 WINDSPORT SPECIFICATIONS

MODEL	32R	34A	34N	35W	36A	36E	36K	36Z
WEIGHT RATING (LBS.)								
Ford Chassis 6.8L Triton	V10	V10	V10	V10	V10	V10	V10	V10
Gross Vehicle (GVWR)	20,500	20,500	22,000	22,000	22,000	22,000	22,000	22,000
Gross Combined (GCWR)	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000
Chevy/Workhorse Chassis								
8.1L Vortec	V8	V8	V8	V8	V8	V8	V8	V8
Gross Vehicle (GVWR)	20,700	22,000	22,000	22,000	22,000	22,000	22,000	22,000
Gross Combined (GCWR)	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000
MEASUREMENTS								
Wheel Base	208"	208"	208"	228"	235"	235"	235"	235"
Exterior Length <i>(without ladder)</i>	33'2"	34'11"	34'11"	37'	37'	37'	37'	37'
Exterior Height <i>(with air conditioner)</i>	12'9"	12'9"	12'9"	12'9"	12'9"	12'9"	12'9"	12'9"
Interior Height	84"	84"	84"	84"	84"	84"	84"	84"
Awning Size	17'	17'	17'	14'	19'	18'	19'	18'
TANK CAPACITIES								
Fuel <i>(gallons)</i>	75	75	75	75	75	75	75	75
LPG <i>(pounds)</i>	100	100	100	100	100	100	100	100
Fresh Water <i>(gallons)</i>	60	60	60	60	60	60	60	60
Waste Water <i>(gallons)</i>	55	48	48	34	48	48	48	48
Gray Water <i>(gallons)</i>	56	49	49	35	49	49	49	49
Water Heater <i>(gallons)</i>	10	10	10	10	10	10	10	10
Furnace <i>(BTUs)</i>	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000

IMPORTANT: Towing capacity may vary by chassis model, floorplan, options and loading of the vehicle. This may result in a towing capacity which is less than the maximum capacity of the hitch. Do not exceed the vehicle's Gross Combined Weight Rating (GCWR), or the hitch rating. A separate functioning brake system is required for any towed vehicle or trailer weighing more than 1,000 lbs. (450 KG) when fully loaded.

VEHICLE LOADING:

Every effort has been made to provide the greatest number of options for the recreation vehicle owner. Along with these choices comes the responsibility to manage the loads that are imposed by the choices so that they remain within the manufacturer's specified chassis weight limits. Do not overload the recreation vehicle.

DRY WEIGHTS:

Based on standard features; optional equipment not included. Net carrying capacity (NCC) determined by subtracting unloaded vehicle weight (UVW) from gross vehicle weight, (GVWR) and includes fluids, options, and cargo. Liquid capacities and weights are approximations only.

WARNING:

This information is intended as a guide only. Weights of individual vehicles may vary. Consult your owner's manual for complete loading, weighing, and towing instructions.



P.O. Box 1486 • Elkhart, Indiana 46515-1486
 Phone: 574-266-1111 • Fax: 574-294-8971
www.fourwinds-rv.com

Product information, specifications, and photography in this brochure were as accurate as possible at time of printing. Photographs may contain some features that are optional on your vehicle. Since we continually strive to improve our products, actual products may differ. Prices and specifications are subject to change without notice. All capacities are approximate and dimensions are nominal. Some features or options may be different or unavailable in Canada.

