

ABLEDATA Fact Sheet on Powered Wheelchairs



Introduction

One of the first decisions facing someone who needs a wheelchair is whether to get a manual wheelchair or a powered wheelchair. For people who have limited use of their arms as well as their legs, a powered wheelchair may be the obvious choice for independent mobility. For many others, including people aging with a disability and people with conditions such as post-polio or multiple sclerosis that may get worse with time, the decision to switch from a manual wheelchair to a powered chair can be a difficult – and often a liberating – choice. This fact sheet is aimed at helping both those who know they need a powered chair and those who are considering whether a powered chair would be the wiser choice. It describes the types of power chairs that are available, their features, and factors to consider in selecting a power chair. The fact sheet also lists manufacturers and helpful publications, organizations, and web sites.

Powered wheelchairs make independent mobility possible for people with limited use of upper as well as lower limbs, since unlike most manual wheelchairs, they do not require the use of arms to roll the wheels. Powered wheelchairs also provide welcome relief for wheelchair users who are starting to experience repetitive motion injuries in their shoulders and arms, as often happens as manual wheelchair users get older.

Types of Powered Wheelchairs

Most powered wheelchairs fall into two types based on overall configuration: Traditional style, which is essentially an adapted version of a traditional manual wheelchair, and platform style, in which a seating system is installed on top of a powered base. There are also many specialized types for particular purposes, such as powered chairs for use on difficult terrain or sandy beaches; chairs with seating systems that can raise the user to a standing position; chairs with elevating, tilt-in-space, or reclining seats; powered chairs for children; and even powered chairs that can climb stairs.

Traditional vs. Platform Configurations

The traditional style powered wheelchair is similar in appearance to a standard everyday wheelchair that has been reinforced to tolerate the extra weight of a power and control system. These chairs usually are powered by a battery attached behind or underneath the seat of the wheelchair. Power-assist systems are available that can be used to convert an existing manual wheelchair to a powered one.



Figure 1: The Cirrus Plus Folding Power Chair from Drive Medical is a traditional configuration power chair.

Most powered wheelchairs are the platform or power-base type, which consists of a seating system set on top of a power base. Typically, the base is rectangular with four or six wheels. Some models have a round power base, which allows for a tighter turning radius nearer that of a scooter. Another variation on the power base concept is a chair that includes built-in lifts to allow the user to raise and lower the seating platform.



Figure 2: The Hoveround MPV 4's rounded base enhances its maneuverability.

Drive System

The drive system is the means by which power is delivered to the chair's wheels. Most powered wheelchairs have either rear wheel drive or front wheel drive. Center or mid-wheel drive also is an option. The drive type can have a significant effect on the maneuverability and handling of the wheelchair.



Figure 3: The Quickie P-11 from Sunrise Medical has a mid-wheel drive power base.

Powered Wheelchairs for Children

There is no general agreement about the age at which a powered wheelchair is appropriate for a child. Many experts as well as parents feel that powered wheelchairs are inappropriate for all young children because of the likelihood that the child will abuse the chair or engage in risky behavior. They are reluctant to give a powered wheelchair to a child until the child is old enough to trust with the chair. Others are more willing to give a powered chair to a younger child, out of a belief that children with serious physical disabilities will benefit developmentally from being mobile at an earlier age.

Another concern is that children and teens need wheelchairs that continue to fit them as they grow. Because of the high cost of replacing a wheelchair of any kind, and because insurance providers often place limitations on how frequently chairs may be replaced, purchasing a new chair each year can be financially prohibitive. This is even truer for powered wheelchairs than for manual chairs, since they generally cost more. One way of dealing with this concern is to buy a powered growth chair that allows adjustments to be made in the existing chair to accommodate a growing child.



Figure 4: The Koala Miniflex from Permobil USA is a front wheel drive wheelchair designed for small children.

How the wheelchair looks is another consideration of special interest for children. It is important that wheelchairs for children and teens should be "friendly looking" or even "cool" to help the child or teen fit more readily into social situations. For this reason, child/youth chairs usually offer a more streamlined appearance and/or brighter upholstery or frame colors than most adult chairs.

For more information on wheelchairs for children, including manual and powered models, see ABLEDATA's **Fact Sheet on Wheelchairs for Children**.

Lightweight Powered Wheelchairs

Lightweight wheelchairs with frames made from lighter materials, such as titanium or aluminum, which were originally developed for wheelchair racing and sports, have become increasingly popular as daily use chairs. A major reason for their popularity is that they are easier to transport; for example, a caregiver or taxi driver can lift a folded lightweight chair into a trunk much more easily than a heavier steel-frame chair. Some powered wheelchairs can be disassembled and folded for transport, but the inclusion of a motor and a battery means that powered wheelchairs weigh more overall compared to manual wheelchairs.

An alternative for someone looking for a lighter powered chair is the powered scooter, with a seat and hand controls atop a narrow three- or four-wheeled platform. The scooter seat provides less body support than a wheelchair seat, but for users with good upper body and arm strength and the ability to sit for extended periods, a scooter may be a somewhat less expensive alternative to a powered wheelchair. For a detailed discussion of scooters and their features, see ABLEDATA's **Fact Sheet on Scooters**.

Elevating and Standing Wheelchairs

An elevating wheelchair has a power lift that elevates and lowers the seat as an aid in transferring or for other purposes. A standing wheelchair has a power lift with a frame for raising the user to a standing position. A wheelchair of this type may be helpful for individuals who have difficulty standing but who need to be able to stand at their jobs, or who want to stand as part of a physical conditioning routine.



Figure 5: The Lifestand Compact is a standing wheelchair from Frank Mobility.

Reclining / Tilt-In-Space Wheelchairs

Reclining wheelchairs and tilt-in-space wheelchairs are available for individuals unable to sit upright for sustained periods or who need to change position without leaving their chair. In a reclining chair, the back reclines independently of the rest of the seating system, while in a tilt-in-space chair the back, seat, and legrests all move together, allowing the person sitting in the chair to tilt back without losing balance. These features are available separately, or, in some models, together.

All-Terrain Chairs and Beach Chairs

For recreational use, there are powered wheelchairs designed specifically for moving over difficult surfaces. These include powered all-terrain chairs with four-wheel drive to aid in moving over rough ground, and powered beach chairs with balloon wheels for moving over sand.



Figure 6: The Beach Cruzr from Hotshot Products is a powered beach chair with balloon wheels for moving on sand.

Stair-Climbing Wheelchairs

The iBot 4000 Mobility System from Independence Technology LLC is an all-terrain, elevating, and stair-climbing powered wheelchair. This chair uses sensors, on-board computers, and gyroscopes to maintain balance while climbing steps or elevating the user to reach high places or to be at eye level with others. The chair has four-wheel drive for navigating sand, gravel, grass, hills, and curbs up to four inches high, and can also operate as a standard powered wheelchair.



Figure 7: The IBOT from Independence Technology has wheels that rise or lower to aid in climbing stairs.

Powered Wheelchair Components

Many powered wheelchair components are similar to those found on manual chairs. However, others such as controllers, batteries, and drive systems are unique to powered wheelchairs.

Folding versus Rigid Frames

Some traditional-style powered wheelchairs have cross-brace frames that allow the chair to be folded or collapsed for storage and transport once the batteries have been removed. Other traditional models and some power base chairs disassemble for transport. Wheels, headrests, armrests, and footrests may be releasable for storage or shipping. There are also powered wheelchairs with rigid frames that do not fold or disassemble.

Frame Materials

In the past, stainless steel was the only material available for wheelchair frames. The introduction of lighter frame materials such as aluminum, titanium, and composites made lightweight wheelchairs possible. Titanium in particular is also stronger and more flexible than steel, making it good for use in sports wheelchairs. Some lighter materials are now being used for powered wheelchairs of both traditional and power base types. However, although use of lighter frame materials may result in powered wheelchairs being lighter than they were in the past, powered chairs are still considerably heavier than manual wheelchairs, with weights ranging from 85 pounds to more than 300 pounds.

Seating System

Seating systems are often sold separately, which allows the wheelchair to be adapted to the individual user. It is important when selecting a wheelchair or a seating system to be sure that the two components are compatible. Power base wheelchairs, because of their modular construction, often have customized chair-style seating systems. The correct seat width and depth are essential for comfort and support, so whether or not the seating system is purchased separately, the right measurements should be selected at purchase. Most wheelchair models are available with a range of seat widths and depths.

Cushions

Cushions are important not only for comfort but also to prevent pressure sores and help keep the user from sliding out of the chair. Cushion types include air, gel, foam, and combinations such as air and foam or gel and foam. Air flotation cushions allow the user to adjust the amount of pressure in the cushion. Cushion thickness may range from 1 to 4 inches. Cushions may be made of moisture-absorbing material that draws perspiration away from the body, or have ridges or bumps to provide some air flow between the body and the surface of the cushion. Cushions may be contoured to reduce pressure on the buttocks. Custom contouring is available to fit the shape of the cushion to the shape of the person sitting on it. To prevent sliding out of the chair, some cushions are higher in front than in the back. Seat belts and harnesses are also available for this purpose.

Upholstery

Upholstery for wheelchairs must withstand daily use in all kinds of weather. Consequently, manufacturers provide a variety of options to users, including nylon, vinyl, and leather. Many manufacturers also offer a selection of upholstery colors, ranging from black to neon, to allow for individual selection and differing tastes among consumers.

Brakes

Most powered chairs utilize a dynamic braking system in which the motor and brakes work together to slow and stop the chair when the joystick or other controller is released, and which automatically engages the brakes when the power is off or when the chair is not being powered in a forward or reverse motion with the controller. Traditional-style chairs frequently also have "parking brakes" (wheel locks) similar to those found on manual chairs which are available in several different designs and can be mounted at various heights to maximize convenience for the user.

Wheels and Tires

Traditional-style chairs generally use the standard four-wheel configuration, with two large wheels at the back and two smaller ones (casters) at the front. The standard tire used for the rear wheels on most wheelchairs is a pneumatic tire, for which the standard sizes are 20 or 24 inches. Smaller and larger sizes, however, also are used as are solid and semi-pneumatic tires. Casters, too, vary in size (generally ranging from six to eight inches in diameter, although smaller sizes are also used) and composition (pneumatic, solid rubber, plastic, or a combination of these). Power base chairs typically use four wheels of the same size, usually 8 to 10 inches in diameter. These chairs may have pneumatic, semi-pneumatic, or solid tires.

Footrests

A variety of footrest assemblies are available on both types of powered wheelchairs, including footrests that fold, swivel, or flip up; rigid single unit footrests; removable/detachable footrests; adjustable length footrests; and footrests with a combination of features.

Armrests

Armrests may be full-length to provide full support for the user's arms, or they may be desk-length (half length) to allow closer access to desks and tables. Armrests of both types may be flip-up, fixed, or detachable. Flip-up armrests can be raised when necessary to fit under a table. Since most people who use powered wheelchair need the upper body support provided by armrests, they are rarely omitted.

Controls

Powered chairs generally include as a standard feature a manually controlled joystick to regulate the chair's speed and direction. However, most manufacturers offer customized control options to accommodate the varied abilities of the user, including sip-and-puff (pneumatic) systems, head and chin switches, push-button controls, trackballs, and tillers. Many chairs also have programmable control features which allow the user or a dealer to adjust or set the chair's speed and control limits as the user's abilities change. There are also manufacturers who do not make wheelchairs, but who offer specialized control systems for powered wheelchairs, including voice-activated controls. When purchasing controls and switches from a source other than the chair's manufacturer, it is essential to determine that the selected control is compatible with the chair.

Batteries

Batteries are a determining factor in the range and power of a powered chair. Generally, larger batteries mean that a wheelchair has greater power and the range between charges. Many chairs require two rechargeable 12-volt batteries. Most wheelchairs utilize U1, group 22 or 24 batteries, although other batteries are also used. More manufacturers are designing chairs around the group 24 battery because it affords a longer range. The type of battery required is also an important consideration in terms of safety, maintenance, and transport. Powered chairs may utilize lead acid, gel cell, or sealed wet batteries. Gel cell batteries require the least maintenance and have less danger of leaking than do the other battery types. Also, a number of airlines will only transport powered chairs with gel cell batteries.

Selecting a Powered Wheelchair

As part of the wheelchair selection process, the person who will use the wheelchair may consult a professional such as a physical or occupational therapist or a physician specializing in orthopedics or rehabilitation medicine. The professional can offer informed advice on many of the chair's features, including the most appropriate kind of seating system and what special features and adaptations are needed. However, even if a professional is consulted, the user must also actively participate in the selection process, since he/she will be most aware of the user's needs and circumstances.

The choice of a powered wheelchair should be based on the how a person intends to use the wheelchair, the physical and functional capabilities of the user, and the user's personal preferences. There are special issues about powered wheelchairs for children, and the cost of a wheelchair is always a concern.

How Will the Chair Be Used?

The choice of a chair should depend in part on its intended use, including the types of environment in which it will be used and how it will be transported. Will it be used primarily indoors or outdoors? Will it be used in the home, at work, for recreation, or in a variety of settings? Will the chair need to be transported? If so, how will it be transported - in a van, a car, or by some form of public transportation? Are there stairs or other barriers to be considered? The answers to these questions will help determine the best chair for the user.

Most powered wheelchairs are designed for both indoor and outdoor use, but chairs differ in their maneuverability and handling on different surface types, and it is important to consider whether the chair will be used on flat surfaces or steep inclines, on floors and sidewalks or on rough terrain, or on surfaces such as sandy ground that give limited traction to wheels.

Since powered wheelchairs run on batteries, battery capacity is an important consideration, especially if the chair will often be used to go up and down hills or for longer trips. Battery capacity is usually stated as range, or the maximum distance the wheelchair can travel between charges of the battery. The maximum range may be as little as 7 miles or as long as 40 miles. Actual range can be reduced by factors such as the user's weight, use of additional powered features, speed, and the type of terrain on which the chair is used.

The use to which a chair will be put is also a factor in the selection of a drive type. According to the authors of *The Powered Wheelchair Training Guide* (Axelson, Minkel, Perr and Yamada, 2002), "Front-wheel drive chairs have good traction going downhill, but can lose traction over sandy or slippery surfaces when going uphill," while in contrast, "[t]he rear-wheel drive chair has the same difficulty with driving backward." "Mid-wheel drive chairs have the potential for better traction than either front-wheel or rear-wheel drive chairs," they write, and "may also be easier to maneuver in tight environments than either front-wheel or rear-wheel drive wheelchairs," although "the user has to get used to tipping back onto their small anti-tip wheels when going up a hill or during rapid acceleration."

Transportation is another important consideration. Is a wheelchair accessible van or bus available to transport the individual in the chair, or is it necessary for the chair to fold or disassemble in order to be carried in an automobile trunk?

Besides everyday use at home, work, or school, the individual may wish to use the chair for recreational activities. If the chair will be used for outdoor recreation, a variety of all-terrain models are available, including powered beach wheelchairs with balloon wheels for riding on sand.

Physical and Functional Capabilities

Powered wheelchairs usually offer a variety of control options to suit a person's physical capacities. Joystick controls mounted on an armrest are usually standard, but other options are available for individuals who are unable to use a joystick, such as switch controls or sip-and-puff controls.

Personal Preferences and Style

Since the person who uses a wheelchair lives with it constantly, personal tastes and values should also be considered. The wheelchair should be compatible with his or her personality. Style and color may be just as important as how the chair feels to the body.

As with manual wheelchairs, the design of powered wheelchairs traditionally stressed function over style. Today, however, the appearance of powered wheelchair models has become more streamlined, and many models are available in a variety of frame styles and upholstery colors.

Assessing a Child's Readiness for a Powered Wheelchair

As part of a project focused on children with orthopedic disabilities, the Los Amigos Research and Education Institute (LAREI) at Rancho Los Amigos National Rehabilitation Center developed an approach to evaluating and training young children for powered mobility, the Powered Mobility Program (PMP), together with a cognitive screening tool called the Pediatric Powered Wheelchair Screening Test (PPWST). According to the LAREI web site, "Although the PPWST is only validated for children with orthopedic disabilities, the PMP approach can be used as a clinical guideline for all populations and age groups." The PMP and PPWST are presented in a video and manual called *Ready, Set Go: Pediatric Powered Mobility*, available for \$100 each from LAREI.

Wheelchair Standards

Comparison of wheelchair features may be facilitated by reference to the standards approved by the American National Standards Institute (ANSI) in cooperation with the Rehabilitation Engineering Society of North America (RESNA). The ANSI/RESNA standards establish uniform requirements for products as well as procedures for information disclosure and consistent measurement of such qualities as wheelchair strength, weight, and stability. The standards themselves are highly technical documents. A two-volume set of all 21 revised standards is available for \$550 from RESNA, 1700 North Moore Street, Suite 1540, Arlington, VA 22209 USA; (703) 524-6686.

Pricing a Powered Wheelchair

Anyone who has purchased or is considering the purchase of a powered wheelchair should be aware of the expense of buying and maintaining one. The purchase price of a powered wheelchair rarely is less than several thousand dollars, and can be much higher for the more deluxe models or those with specialized adaptations. Thus, a powered wheelchair is a major financial investment. Like any major financial decision, purchase of a powered wheelchair should be undertaken with care to ensure the product meets the needs of the individual who will be using it.

When comparing retail prices, consumers should be careful to ask the retailer which features and options are included in the stated price and which are extra. For example, does the stated price include the seating system or only the power base? Are the battery and battery charger included with the chair or are they extra-cost items? The manufacturer should have a price list available that indicates which features are standard and which optional, and showing how the price is affected by options selected and any custom or individualized modifications.

Funding Sources

The primary funding sources for wheelchairs are private medical insurance, Medicare, and Medicaid. Worker's Compensation insurance may be another funding source if the wheelchair is needed as the result of a workplace injury. Insurance plans will only pay for wheelchairs and wheelchair accessories insofar as they are deemed medically necessary, and medical necessity can be an issue in paying for powered wheelchairs. Some insurance plans, including Medicare, may deem powered wheelchairs not medically necessary for individuals who can walk a short distance without assistance. Issues of medical necessity may also exclude coverage of some optional features that would be beneficial to the individual but which are not deemed necessary. There may be other limitations on coverage as well, such as frequency of replacement.

Many States offer an Assistive Technology Alternative Financing Program that help people with disabilities to qualify for and receive low cost loans to purchase assistive products or services. A list of these State projects is available from RESNA at <http://www.resna.org/AFTAP/state/>.

Each State also offers a State Assistive Technology Project that supports consumer-driven, statewide, technology-related assistance for individuals of all ages with disabilities. There are 56 projects (one in each State and in D.C. and the U.S. territories). A list of these projects can be found on the ABLEDATA Web site at <http://www.abledata.com/abledata.cfm?pageid=113573&top=16050&ksectionid=19326&stateorganizations=1>.

For more on funding sources, see the ABLEDATA **Informed Consumer Guide to Funding Assistive Technology**.

A Good Start ...

New wheelchairs are being introduced to the market every year. One of the easiest ways to keep up-to-date on what is available is to consult the ABLEDATA Web site (<http://www.abledata.com>) where we list information on more than 22,000 currently available assistive products for people with disabilities. Information on all types of wheelchairs available in the United States is included in the ABLEDATA product listings, as well as contact information for wheelchair manufacturers and national distributors. Information on specific models also is available from the manufacturers and distributors; a list of manufacturers and distributors with their respective contact information is found in the next section of this fact sheet.

ABLEDATA offers more detailed information on the wheelchair selection process in our **Informed Consumer's Guide to Wheelchair Selection**. We also offer fact sheets on manual wheelchairs, children's wheelchairs, and scooters. Each of these publications also provides a list of resources and related reading. All ABLEDATA publications may be downloaded free from the ABLEDATA Web site, <http://www.abledata.com>, or paper copies may be ordered for a small fee.

Manufacturers and Distributors

The following companies sell powered wheelchairs. For each manufacturer or distributor, we have provided full contact information (including street address, telephone [voice unless otherwise noted] and fax numbers, e-mail address, and Web address) and a brief list of the types of wheelchairs sold.

21st Century Scientific, Inc.

4915 Industrial Way
Coeur d'Alene, ID 83815 USA
Telephone: 800-448-3680 toll free or 208-667-8800.
Fax: 208-667-6600.
E-mail: 21st@wheelchairs.com.
Web site: <http://www.wheelchairs.com>.
Chair types: Bariatric powered chairs.

Alber (Ulrich Alber GmbH)

Vor dem Weissen Stein 21
D-72461 Albstadt-Tailfingen
Germany
Telephone: 011-49-7432/2006-0.
Fax: 011-49-7432/2006-299.
E-mail: info@ulrich-alber.de.
Web site: <http://www.ulrich-alber.com>.
Product type(s): Stair-climbing; folding.
Distributed in the United States by Frank Mobility.

Amigo Mobility International, Inc.

6693 Dixie Highway
Bridgeport, MI 48722-9725 USA
Telephone: 800-692-6446 toll free or 517-777-0910.
Fax: 800-334-7274 toll free.
E-mail: info@myamigo.com.
Web site: <http://myamigo.com>.
Chair type(s): Powered transport chairs; indoor/outdoor.

Balder USA, Inc.

580 TC Jester
Houston, TX 77007 USA
Telephone: 888-422-5337 toll free or 713-864-1460.
Fax: 713-864-1469.
E-mail: info@balderusa.com.
Web site: <http://www.balderusa.com>.
Chair type(s): Reclining / tilt-in-space powered chairs; adult / child.

Bromac Assistive Technology, a division of Brown Machine Works

HCR1 Box 29

57899 West Rhodes Avenue

Dateland, AZ 85333 USA

Telephone: 805-797-7989.

E-mail: bromac@as.net.

Web site: <http://fp1.antelecom.net/bromac/>.

Product type(s): Electric elevating powered wheelchair.

Convaquip Industries, Inc.

4834 Derrick Drive

P.O. Box 3417

Abilene, TX 79604 USA

Telephone: 800-637-8436 toll free or 325-677-4177.

Fax: 325-677-7217.

E-mail: info@convaquip.com.

Web site: <http://www.convaquip.com>.

Chair type(s): Bariatric.

Dalton Medical

1103 Venture

Carrollton, TX 75006 USA

Telephone: 972-418-5129.

Fax: 972-418-5706.

E-mail: sales@daltonmedical.com.

Web: <http://www.daltonmedical.com>.

Chair type(s): Traditional and power base models; standard; and extra-wide.

Drive Medical Design and Manufacturing

99 Seaview Boulevard

Port Washington, NY 11050 USA

Telephone: 877-224-0946 toll free.

Fax: 516-998-4601.

Web site: <http://www.drivemedical.com>.

Chair type(s): Folding powered wheelchair.

Falcon Rehabilitation Products, Inc

3538 Peoria St. Unit 511

Aurora, CO 80010 USA

Telephone: 800-370-6808 toll free or 303-340-4529.

Fax: 303-340-3863.

Web site: <http://www.falconrehab.com>.

Product type(s): Standing, tilt, and reclining powered wheelchairs.

Frank Mobility Systems, Inc.

1003 International Drive

Oakdale, PA 15071 USA

Telephone: 888-426-8581 toll free or 724-695-7822.

Fax: 724-695-3710.

E-mail: info@frankmobility.com.

Web site: <http://www.frankmobility.com>.

Product type(s): Standing, stair-climbing, and indoor/outdoor.

U.S. distributor for Alber.

Gendron, Inc

400 E. Lugbill Road

Archbold, OH 43502 USA

Telephone: 800-537-2521 toll free or 419-445-6060.

Fax: 419-446-2631.

E-mail: sales@gendroninc.com.

Web site: <http://www.gendroninc.com>.

Chair type(s): Bariatric power chairs (standard and tilt/recline)

Gowrings Mobility Ltd

Bone Lane

Newbury, Berkshire RG14 5UE

United Kingdom

Telephone: 011-44-845-6088030.

Fax: 011-44-1635-529400.

E-mail: info@gowringsmobility.co.uk.

Web site: <http://www.gowringsmobility.co.uk>.

Chair type(s): Chair with power elevation and recline for use in driving wheelchair-accessible vans.

Graham-Field Health Products, Inc.

2935 Northeast Parkway

Atlanta, GA 30360 USA

Telephone: 800-347-5678 toll free.

Fax: 800-726-0601 toll free.

Web site: <http://www.grahamfield.com>.

Chair type(s): Rear, mid-, and front wheel drive powered wheelchairs.

Hotshot Products

1920 Del Amo Blvd. #A

Torrance, CA 90501 USA

Telephone: 888-663-5911 toll free or 310-533-5911.

Fax: 310-533-1971.

E-mail: b1hotshot@aol.com.

Website: <http://www.hotshotproducts.org>.

Chair type(s): Powered beach chairs.

Hoveround Corporation

2151 Whitfield Industrial Way

Sarasota, FL 34243 USA

Telephone: 800-542-7236 toll free.

Fax: 941-727-8686.

Web site: <http://www.hoveround.com>.

Chair type(s): Front and rear wheel drive chairs with round power platform, including bariatric model.

Independence Technology, L.L.C.

P.O. Box 7338

Endicott, NY 13760 USA

Telephone: 866-813-0761 toll free.

E-mail: customerzone@indus.jnj.com.

Web site: <http://www.independencenow.com>.

Products: Stair-climbing wheelchair.

Innovations In Motion, a division of Vestil Manufacturing Company

900 Growth Parkway

Angola, IN 46703 USA

Telephone: 800-327-0681 toll free or 260-668-5677.

Fax: 800-232-0599 toll free or 260-668-8967.

E-mail: iim@mobility-usa.com.

Web site: <http://www.mobility-usa.com>.

Chair type(s): Mid-wheel drive and four-wheel drive all-terrain power chairs.

Invacare Corporation

One Invacare Way

PO Box 4028

Elyria, OH 44036 USA

Telephone: 800-333-6900 toll free or 440-329-6000.

E-mail: info@invacare.com.

Web site: <http://www.invacare.com>.

Chair type(s): Standard, foldable, bariatric, and lightweight power chairs with rear or mid-wheel drive

LEVO USA, Inc.

211 Fulton Court

Peachtree City, GA 30269 USA

Telephone: 888-538-6872 toll free or 770-486-0033.

Fax: 770-486-6096.

E-mail: request@levousa.com.

Web site: <http://www.levousa.com>.

Chair type(s): Power standing wheelchairs.

Meyra (Wilhelm Meyer GmbH & Co.)

Meyra-Ring 2

D-32689 Kalletal, Germany

Telephone: 011-49-05733-922-0.

Fax: 011-49-05733-922-143.

E-mail: info@meyra.de.

Web site: <http://www.meyra.com>.

Chair type(s): Standard, reclining, and child/youth power wheelchairs.

Orthofab Inc.

2160, De Celles Street

Quebec City, Quebec G2C 1X8

Canada

Telephone: 800-463-5293 toll free or 418-847-5225.

Fax: 418-847-7961.

E-mail: info@orthofab.com.

Web site: <http://www.orthofab.com>.

Product type(s): Powered tilt-in-space wheelchair.

Permobil USA

6961 Eastgate Blvd.

Lebanon, TN 37090 USA

Telephone: 800-736-0925 toll free.

Fax: 800-231-3256 toll free.

E-mail: info@permobilusa.com.

Web site: <http://www.permobilusa.com>.

Chair type(s): Pediatric; bariatric; front-wheel and rear-wheel drive.

Pride Mobility Products Corp.

182 Susquehanna Avenue

Exeter, PA 18643 USA

Telephone: 800-800-8586 toll free.

Fax: 800-800-1636 toll free.

Web site: <http://www.pridemobility.com>.

Chair type(s): Power chairs; scooters.

Redman Power Chair

1660 S. Research Loop #126

Tucson, AZ 85710 USA

Telephone: 800-727-6684 toll free.

Fax: 877-550-1277 toll free.

E-mail: info@redmanpowerchair.com.

Web site: <http://www.redmanpowerchair.com>.

Chair Type(s): Standing/reclining power chairs; pediatric/adult.

RJ Mobility Ltd

Boy Lane
Wheatley, Halifax, HX3 5AF
United Kingdom
Telephone: 011-44-1422-358888.
Fax: 011-44-1422-355924.
E-mail: enquiry@rjmobility.com.
Web site: <http://www.rjmobility.com>.
Chair type(s): Folding lightweight power chairs.

Shoprider Healthcare, Inc.

21184 S. Figueroa St.
Carson, CA 90745 USA
Telephone: 800-743-0772 toll free or 310-328-8866.
Fax: 800-797-7081 toll free or 310-328-8185.
E-mail: customerservice@shoprider.com.
Web site: <http://www.shoprider.com>.
Chair type(s): Folding, sports, and narrow frame power chairs with mid- and rear-wheel drive.

Sunrise Medical

Mobility Products Division
7477 East Dry Creek Parkway
Longmont, CO 80503 USA
Telephone: 888-333-2572 toll free or 303-218-4600.
Fax: 303-218-4590.
Web site: <http://www.sunrisemedical.com>.
Chair type(s): Mid-wheel and rear-wheel drive; lightweight; tilt-in-space; reclining; child/youth.

TEFTEC Corporation

12450 Network Boulevard
San Antonio, TX 78249 USA
Telephone: 888-234-1433 toll free or 210-477-0330.
Fax: 210-477-0329.
E-mail: tefttec@tefttec.com.
Web site: <http://www.tefttec.com>.
Chair types: Front-wheel drive; bariatric; indoor/outdoor.

Tuffcare, Inc.

3999 East La Palma Ave.

Anaheim, CA 92807-1714 USA

Telephone: 800-367-6160 toll free or 714-693-8668.

Fax: 714-632-3998.

E-mail: contact@tuffcare.com.

Web site: <http://www.tuffcare.com>.

Chair type(s): Pediatric; folding; reclining; adult; front-wheel drive and rear-wheel drive.

Wheelchairs of Kansas

204 W. 2nd St.

Ellis, KS 67637 USA

Telephone: 800-537-6454 toll free.

Fax: 800-337-2447 toll free.

E-mail: wokinfo@go2wok.com.

Web site: <http://www.wheelchairsofkansas.com>.

Chair type(s): Bariatric and non-bariatric power chairs.

This list includes all the manufacturers of manual wheelchairs listed in the ABLEDATA product database as of March, 2006.

The records in the ABLEDATA database are provided for information purposes only. Neither the U.S. Department of Education nor Macro International Inc. have examined, reviewed, or tested any product, device, or information contained in ABLEDATA. The Department and Macro International Inc. make no endorsement, representation, or warranty express or implied as to any products, device, or information set forth in ABLEDATA.

For an updated list of Web links to manufacturers and distributors, go to the ABLEDATA Web site, <http://www.abledata.com>.

Publications

ANSI/RESNA Wheelchair Standards, two volumes, Arlington, VA: RESNA Press, 1998.
Volume 1 covers requirements and test methods applying to all wheelchairs and scooters; Volume 2 covers additional requirements for wheelchairs and scooters with electrical systems.

Axelson, Peter, Jean Minkel, and Denise Chesney, *A Guide to Wheelchair Selection: How to Use the ANSI/RESNA Wheelchair Standards to Buy a Wheelchair*, Washington DC: Paralyzed Veterans of America, 1994.

This book provides useful information on wheelchair standards and test procedures in a consumer-friendly format. By explaining how to use the information disclosed by test procedures, the book can help wheelchair users be more informed when selecting a wheelchair.

Axelson, Peter, Jean Minkel, Anita Perr, and Denise Yamada, *The Powered Wheelchair Training Guide*, Minden, NV: PAX Press, a division of Beneficial Designs, Inc., 2002.

This book provides detailed guidance on configuring and operating a powered wheelchair. Selected excerpts are available at <http://www.wheelchairnet.org>.

Karp, Gary, *Choosing a Wheelchair: A Guide for Optimal Independence*, Sebastopol, CA: O'Reilly & Associates, 1998.

This guidebook is written for the wheelchair user. It discusses issues such as "Who Pays for Your Chair?" and power versus manual, and has whole chapters devoted to specific features such as Cushions; Seats and Backs; Footrests; Tires, Casters, and Suspension Systems; Tilt/Recline and Positioning Systems; and Armrests, Clothing Guards, and Accessories. Information and excerpts from this book are available at Gary Karp's disability resource web site, Life on Wheels, <http://www.lifeonwheels.net>.

Los Amigos Research and Education Institute (LAREI), *Ready, Set Go: Pediatric Powered Mobility*, Downey, CA: Rancho Los Amigos National Rehabilitation Center.

This training video and manual present the Pediatric Powered Wheelchair Screening Test (PPWST) and the Powered Mobility Program (PMP). The PMP was designed to for use by clinicians in evaluating and training very young children for powered mobility. The video time is approximately 1 hour. Scoring sheets are included.

National Institute for Rehabilitation Engineering (NIRE), *Power Wheelchairs and User Safety*. http://www.abledata.com/abledata_docs/PowerChair-Safety.htm.

This paper discusses many power wheelchair safety issues, including the safe transportation of a person in a power wheelchair in a wheelchair van - as passenger or driver.

For an updated list of publications on powered wheelchairs, go to the AT Library at the ABLEDATA Web site, <http://www.abledata.com>.

Resources

Paralyzed Veterans of America

801 Eighteenth Street, NW

Washington, DC 20006-3517 USA

Telephone: 800-424-8200 toll free

Web site: <http://www.pva.org>.

E-mail: info@pva.org.

PVA is a veterans service organization formed to serve veterans with spinal cord injury or disease. It publishes Sports 'N Spokes and Paraplegia News magazines. Its web site is a resource center for veterans and others with SCI, and includes much wheelchair-related information.

Rehabilitation Engineering Research Center (RERC) on Wheelchair Transportation Safety

5044 Forbes Tower

Department of Rehabilitation Science and Technology

University of Pittsburgh

Pittsburgh, PA 15260 USA

Telephone: 412-383-6596.

TT: 412-383-6596.

Fax: 412-383-6597.

E-mail: lerc@shrs.pitt.edu.

Web site: <http://www.lercwtspitt.edu>.

Projects of the RERC on Wheelchair Transportation Safety include research and development, information dissemination, training, and technology transfer related to transportation safety for wheelchair-seated passengers and drivers. Its web sites include WheelchairNet (<http://www.wheelchairnet.org>), an informational web site for wheelchair users and others interested in wheeled mobility, and the Wheelchair Standards Information web site, <http://www.wheelchairstandards.pitt.edu>, with information on the development of standards for wheelchair transportation safety. The RERC is sponsored by grants from the National Institute on Disability and Rehabilitation Research (NIDRR).

Rehabilitation Engineering Research Center on Wheeled Mobility

Georgia Institute of Technology

Center for Assistive Technology and Environmental Access (CATEA)

490 Tenth Street, NW

Atlanta, GA 30318 USA

Telephone: 404-385-4691.

Fax: 404-894-9320.

E-mail: randy.bernard@arch.gatech.edu.

Web site: <http://mobilityrerc.catea.org>.

Mobility RERC conducts research to identify the needs of wheelchair users and to develop appropriate products to meet their needs. In addition to wheelchairs, it focuses on seating, environmental barriers, and interactive training techniques. Mobility RERC is sponsored by grants from the National Institute on Disability and Rehabilitation Research (NIDRR).

Spinal Cord Injury Peer Information Library on Technology (SCI PILOT)

c/o Toronto Rehabilitation Institute
520 Sutherland Drive
Toronto, Ontario MAG 3V9
Canada
Telephone: 416-587-3422, ext. 6264.
Fax: 416-422-5216.
E-mail: info@scipilot.com.
Web site: <http://www.scipilot.com>.

SCI PILOT is an information resource describing the assistive technology experiences of individuals with spinal cord injury from their own perspective, including consumer reviews of wheelchairs.

SpinLife.com

1108 City Park Ave., Suite 201
Columbus, OH 43206 USA
Telephone: 800-850-0335 toll free or 614-449-8123.
Fax: 888-873-6543.
Web site: <http://www.spinlife.com>.

This site sells wheelchairs, parts and accessories online and also provide a wealth of resources both of their own making (including the *SpinZine* e-zine) and through links to other sites. To aid customers in selecting a product, SpinLife has an on-line tool, the Advisor, which asks a series of questions such as intended use of the product and desired price range, then produces a list of products that they sell meeting those criteria. Note that the Advisor is limited to the products that SpinLife.com sells.

USA TechGuide

United Spinal Association
75-20 Astoria Boulevard
Jackson Heights, NY 11370 USA
Telephone: 718-803-3782.
Fax: 718-803-0414.
E-mail: info@unitedspinal.org.
Web site: <http://www.usatechguide.org>.

The USA TechGuide is an Internet guide to wheelchairs and assistive technology, with reviews of specific wheelchair models, written by caregivers and professionals. It is sponsored by the United Spinal Association, formerly the Eastern Paralyzed Veterans Association.

Wheelchair Junkie

Web site: <http://www.wheelchairjunkie.com>.

This web site, owned and operated by Mark E. Smith, has information for consumers on many aspects of powered and manual wheelchairs and wheelchair accessories, including product reviews written by wheelchair users.

The Wheelchair Site

Geosign Technology Partners (GTP), a subsidiary of Geosign Corporation

2201 Pine Avenue

Niagara Falls, NY 14301 USA

Telephone: 866-436-7446 toll free.

E-mail: editor@thewheelchairsite.com.

Web site: <http://www.thewheelchairsite.com>.

This site is designed to be an independent consumer's guide to wheelchairs, scooters, and accessories. The site includes general information about various types of chairs, company links, a reader's mailbag, and wheelchair-related news.

WheelchairNet

5051 Forbes Tower

University of Pittsburgh

Pittsburgh, PA 15260 USA

Telephone: 412-383-6793

Fax: 412-383-6597

E-mail: wheelchairnet@shrs.pitt.edu.

Web site: <http://www.wheelchairnet.org>.

WheelchairNet is a virtual community for wheelchair users and people who share a common interest in wheelchair technology and its improvement and successful application. The site offers a wide variety of resources for wheelchair users and enthusiasts as well as a place in cyberspace for them to exchange and disseminate information, advice, and insights on wheelchairs.

For an updated listing of organizations and other resources for people with disabilities, go to the ABLEDATA Web site, <http://www.abledata.com>.

This fact sheet was revised and updated by David G. Johnson, and was produced by ABLEDATA. ABLEDATA is funded by the National Institute on Disability and Rehabilitation Research (NIDRR) under contract number ED-02-CO-0038 and is operated by ORC Macro.

ABLEDATA

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TT: 301-608-8912.

Fax: 301-608-8958.

All ABLEDATA publications, the ABLEDATA database of assistive technology, and other ABLEDATA resources are available on the ABLEDATA Web site, <http://www.abledata.com>.

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