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K0009/E1229 CODE RATIONALE

FOR

TiLite X and SX

Introduction:

The TiLite X and SX wheelchairs have not been code verified by the SADMERC. For the reasons stated in this document, TiLite believes that the miscellaneous manual wheelchair codes (K0009 for adult size wheelchairs and E1229 for pediatric size wheelchairs¹) are the most appropriate codes to use for the TiLite X and SX wheelchairs.

Functional, Physical and Technological Differences from Existing Codes:

The TiLite X and SX wheelchairs represent the current state-of-the-art in folding, fully adjustable, manual wheelchair design, whereas the existing manual wheelchair HCPCS codes reflect the state-of-the-art in manual wheelchairs from the 1980's. Being state-of-the-art, the TiLite X and SX are significantly different from K0005 and E1238 wheelchairs. These differences include: (1) functional differences, including lower weight; (2) physical differences; and (3) technological differences. Each of these differences will be addressed below. The long-term use of manual wheelchairs has been proven to result in a significant likelihood that the wheelchair user will experience upper limb pain and/or injuries to the wrist, elbow and/or shoulder. Therefore, while these functional, physical and technological differences are important, more important is the fact that the TiLite X and SX wheelchairs present a significant opportunity to improve patient health outcomes for long-term wheelchair users.

¹ Adult Codes: According to the DMERC Medical Policy for Manual Wheelchair Bases, a manual wheelchair with a seat width and depth of 15" or more is considered to be an adult size wheelchair and must be billed as K0001 to K0007 or K0009. Because an adult size (18" seat width and 16" seat depth) TiLite X or SX weighs only 19.8 lbs or 20.9 lbs, respectively, with 24" wheels but without front riggings, codes K0001 through K0003 are not applicable. Because the TiLite X and SX are adjustable wheelchairs, code K0004 is not applicable. Because the weight capacity of the TiLite X and SX is 250 lbs., codes K0006 and K0007 are not applicable. Therefore, the remaining adult code possibilities are K0005 (Ultralightweight Wheelchair) and K0009 (Other Manual Wheelchair/Base). It is TiLite's view that an adult size TiLite X or SX is most appropriately coded as K0009 not as K0005.

Pediatric Codes: According to the DMERC Medical Policy for Manual Wheelchair Bases, a manual wheelchair with a seat width and/or depth of 14" or less is considered to be a pediatric size wheelchair and must be billed as E1231 to E1238 or E1229. The TiLite X and SX are not tilt-in-space wheelchairs and, therefore, codes E1231 through E1234 are not applicable. The TiLite X and SX do not come with a "seating system" that is integral to the chair and, therefore, codes E1235 and E1236 are not applicable. The TiLite X and SX are not rigid chairs and, therefore, code E1237 is not applicable. Therefore, the remaining pediatric code possibilities are E1238 (Wheelchair, Pediatric Size, Folding, Adjustable, Without Seating System) and E1229 (Wheelchair, Pediatric Size, Not Otherwise Specified). It is TiLite's view that a pediatric size TiLite X or SX (14" or smaller seat width and/or depth) is most appropriately coded as E1229 not as E1238.



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Materials

TiLite X and SX wheelchairs generally utilize aerospace grade titanium alloys and other advanced materials to construct the wheelchair frame. By contrast, K0005 and E1238 wheelchairs generally utilize 6061-T6 aluminum or 4130 steel alloys. Aerospace grade titanium alloys represent a significant advance in metallurgy as compared with aluminum or steel. Titanium has a significantly higher strength-to-weight ratio, which results in the ability to create far lighter wheelchair frames than frames made with either aluminum or steel. Titanium also will not rust, which is an advantage compared with steel, and it will not corrode, an advantage over both aluminum and steel. Titanium will not “work-fatigue,” which is a physical process whereby a metal subjected to repeated stress will, over time, become brittle making it prone to crack.

Lastly, titanium acts as a natural shock absorber, meaning that it absorbs vibration to a far greater degree than either aluminum or steel. When used in a wheelchair, this property of titanium has two distinct advantages for wheelchair users. First, by absorbing more vibration, the wheelchair will roll more smoothly over rough terrain. As a result, the wheelchair will bounce around less, which means that, with each propulsion stroke, more of the user’s energy results in forward movement. Second, less vibrational energy will be transmitted to the wheelchair user. This is a significant benefit as many wheelchair users, particularly those with spinal cord injuries, are subject to significant back pain resulting from the vibrations transmitted by aluminum and steel wheelchairs. This advantage presented by titanium is so significant that many leading physicians recommend titanium chairs over suspension chairs for their patients who are subject to such back pain.

Unlike a traditional K0005 or E1238 wheelchair, a TiLite X or SX wheelchair made from titanium will almost never need to be replaced. As proof of this fact, in the more than eight years that TiLite has been marketing its titanium wheelchairs, TiLite has experienced a frame failure rate of less than one-half of one percent (0.5%).

Weight

The TiLite X and SX are significantly different from K0005 and E1237 wheelchairs. The most significant difference is weight-related, but numerous health benefits flow from that difference. An 18” x 16” TiLite X weighs 19.8 lbs, including 24” rear wheels and all other standard options, but excluding the standard footrest assembly. An 18” x 16” TiLite SX weighs 20.9 lbs, including 24” rear wheels and all other standard options, but excluding the standard footrest assembly. The following table indicates how significant this low weight is relative to competing products from Quickie and Invacare.



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Wheelchair Manufacturer and Model	Manufacturer Recommended Code	Weight With Standard Accessories but Without “Front Riggings”
TiLite X	K0009	19.8 lbs (18” x 16”)
TiLite SX	K0009	20.9 lbs (18” x 16”)
Quickie 2	K0005	28.0 lbs (18” x 16”)
Invacare MVP	K0005	29.0 lbs (18” x 16”)
Invacare ProSpin X4	K0005	27.0 lbs (18” x 16”)

The foregoing table makes it clear that the adult size TiLite X and SX have a weight advantage of at least 6 to 9 lbs. By virtue of the weight savings, TiLite X and SX wheelchairs have two key advantages over K0005 and E1238 wheelchairs:

- they are easier to self-propel because rolling resistance is reduced-which is a function of both the lower weight and the vibration-absorbing properties of the materials used; and
- they are easier for the user to lift into and out of the user’s vehicle when transferring to and from the user’s vehicle.

With respect to self-propelling, an example demonstrates the magnitude of this advantage. The average manual wheelchair user pushes the pushrim 3500 times per day. Boninger, ML, Dicianno, BE, Cooper, RA, Towers, JD, Koontz, AM, Souza, AL. *Shoulder Magnetic Resonance Imaging Abnormalities, Wheelchair Propulsion & Gender*. Arch Phys Med & Rehab, 2003; Vol. 84:1615-1620. Assuming an average 6 lbs weight savings and multiplying by 3,500, it is apparent that a user in a TiLite X or SX will push at least 21,000 lbs. less each day. That is at least 10.5 tons per day and at least 3,800 tons per year! And assuming a 9-lb weight savings, these figures would all increase by 50%.

It has been noted that the life expectancy of persons with spinal cord injury is approaching that of the general population, and it is not uncommon for such people to self-propel in a manual wheelchair for 40 or 50 years. Therefore, the impact of the weight savings provided by TiLite X or SX wheelchairs becomes increasingly magnified over time. Over extended periods of time, use of the lightest possible wheelchair will (a) reduce the need for very expensive surgeries to repair upper limb injuries and the associated extended rehabilitation and convalescence, and (b) delay the need to transition long-term manual wheelchair users to more expensive power wheelchairs.

Long-Term Manual Wheelchair Use Is Proven to Increase Upper Limb Pain and Injury:

As more fully explained below, there are significant adverse health effects of the long term use of manual wheelchairs.

Studies of people with spinal cord injury (“SCI”) have found that the incidence of Carpal Tunnel Syndrome (“CTS”) among wheelchair users with SCI is between 40% and 66%. See Sie, I.H. et al., *Upper Extremity Pain in the Postrehabilitation Spinal Cord Injured Patient*, Arch Phys Med & Rehabil, 1992, Vol. 73:44-8 (“Sie, 1992”). Aljure, J. et al., *Carpal Tunnel Syndrome in*



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Paraplegic Patients, Paraplegia, 1985, Vol. 23:182-6. Gellman, H. et al., *Carpal Tunnel Syndrome in Paraplegic Patients*, J Bone & Joint Surg, 1988, Vol. 70:517-9. Gellman, H. et al., *Late Complications of the Weight-Bearing Upper Extremity in the Paraplegic Patient*, Clin Ortho & Related Research, 1988, Vol. 233:132-5 (“Gellman, 1988b”).

Studies of people with SCI have found that the incidence of shoulder problems among wheelchair users with SCI is between 30% and 60%. See Sie, 1992. Gellman, 1988b. Pentland, W.E., et al., *Upper Limb Function in Persons with Long Term Paraplegia and Implications for Independence*, Paraplegia, 1994, Vol. 32:211-8. Ballinger, D.A. et al., *The Relation of Shoulder Pain and Range-of-Motion Problems to Functional Limitations, Disability and Perceived Health of Men with Spinal Cord Injury*, Arch Phys Med & Rehabil, 2000, Vol. 81:1575-81. Nichols, P.J. et al., *Wheelchair User’s Shoulder? Shoulder Pain in Patients with Spinal Cord Lesions*, Scand J Rehabil Med, 1979, Vol. 11:29-32. Subbarao, J.V. et al., *Prevalence and Impact of Wrist and Shoulder Pain in Patients with Spinal Cord Injury*, J Spinal Cord Med, 1994, Vol. 18:9-13 (“Subbarao, 1994”).

Sie, 1992, found that 59% of individuals with tetraplegia and 41% of individuals with paraplegia experience significant pain in their upper limbs. “Significant pain” is defined as pain requiring analgesic medication, pain associated with two or more activities of daily living (“ADLs”) or pain severe enough to result in cessation of activity. Upper limb pain correlates with increased need for assistance with functional activities and decreased independence. See Dalyan, M. et al., *Upper Extremity Pain after Spinal Cord Injury*, Spinal Cord, 1999, Vol. 37:191-5 (“Dalyan, 1999”). In this study, 26% of persons with pain required additional help with functional activities and 28% reported that pain resulted in limitations on independence.

Employment status is adversely affected by upper limb pain—individuals with SCI who experience upper limb pain are three times more likely to be unemployed and less than half as likely to be employed full-time. See Dalyan, 1999.

Reducing Forces at the Wheelchair Pushrim During Self-Propulsion Proven to Reduce the Adverse Health Effects of Long-Term Manual Wheelchair Use:

Individuals who apply higher forces to the wheelchair pushrim when self-propelling will, over time, experience reduced sensory amplitude during nerve conduction studies. See Boninger, M.L. et al., *Wheelchair Pushrim Kinetics: Weight and Median Nerve Function*, Arch Phys Med & Rehabil, 1999, Vol. 80:910-15 (“Boninger, 1999”). As the combined weight of the user and the wheelchair increases, the force required to propel the wheelchair increases. Boninger, 1999.

In a study of individuals who had nerve conduction studies and biomechanical analyses two years apart, it was shown that those whose pushrim forces were a high percentage of their body mass had worse nerve conduction studies at follow-up and were less effective at propelling their wheelchairs. See Fronczak, K. et al., *Wheelchair Propulsion Biomechanics, Weight and Median Nerve Damage: A Longitudinal Study*, 26th Annual RESNA Conference, Atlanta, GA, 2003.

These long-term study results should come as no surprise given the design, function and technological advances described above. Because a TiLite X or SX wheelchair has lower rolling resistance than competing K0005 or E1238 wheelchairs, users of TiLite X or SX



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wheelchairs are able to (a) minimize the frequency of the propulsive strokes necessary to self-propel the wheelchair, and (b) reduce the force required to self-propel the wheelchair.

Manual Wheelchair Codes are Being Revised:

With respect to adult wheelchair codes, the HCPCS coding system uses wheelchair weight as a primary factor to differentiate among adult manual wheelchair codes. For example, when the K0005 HCPCS Code was established in 1994, CMS recognized a new, lighter-weight standard for manual wheelchairs. The K0005 Ultralightweight Wheelchair code reduced wheelchair weight by 4 lbs, or 12%, over the existing K0004 High-Strength, Lightweight Wheelchair Code. Today, state-of-the-art wheelchairs, both adult and pediatric, can save a further 5 to 10 lbs. or more of weight.

The following chart indicates the existing and proposed HCPCS codes and relative weight reductions between codes (excluding the K0002 code that is merely a variation of the K0001 code):

HCPCS Code	Code Name	Wheelchair Weight	Weight Reduction from Preceding Code	% of Weight Reduction from Preceding Code
K0001	Standard Wheelchair	>36 lbs.	--	--
K0003	Lightweight Wheelchair	34-36 lbs.	0 to 2 lbs.	0% to 5.6%
K0004	High-Strength Lightweight Wheelchair	<34 lbs.	2 lbs.	5.6%
K0005	Ultralight-weight Wheelchair	<30 lbs.	4 lbs.	11.8%
Not yet determined	Not yet determined	<21 lbs.	9 lbs.	30.0%

At the time the K0005 code was created, K0004 already existed. Since it was determined that a new K0005 code was necessary, it logically follows that it must have been determined that the existing K0004 code was inadequate to describe a class of products that promised an 11.8% weight reduction. Following that logic, the existing K0005 code cannot be adequate to describe a class of products that delivers a 30% weight reduction.

In the ten years since CMS last visited the subject of the basic manual wheelchair codes, substantial amounts of time and money have been invested in wheelchair research and development by TiLite and other manufacturers in an effort to:

- reduce wheelchair weights, thereby reducing the frequency and severity of joint deterioration, injury and pain experienced by wheelchair users;
- increase the durability of wheelchairs to prevent wheelchair users from being stranded or house-bound due to the downtime involved with wheelchair repairs and replacement; and
- improve wheelchair functionality, thereby facilitating much greater integration of wheelchair users into society and significantly contributing to the fulfillment of the goals of the American with Disabilities Act.



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Based on the meetings with the SADMERC described below we expect that this will be changing in the near future. At the request of the SADMERC, in April 2005 a group representing NCART (including TiLite, Sunrise Medical and Invacare) met with the SADMERC to discuss necessary changes in manual wheelchair codes. Since then, NCART has been working closely with the SADMERC on a complete overhaul of the manual wheelchair codes in a fashion similar to the overhaul of the power wheelchair codes. At this time, TiLite is optimistic that the new codes will include codes that accurately reflect the state-of-the-art in manual wheelchair design—in other words, there will be codes that reflect the extremely low weight and/or highly customized (“made-to-measure”) nature of TiLite wheelchairs. We anticipate that new codes will be adopted in 2007 with an effective date in 2008.

Further coding developments support TiLite’s position and illustrate the SADMERC’s new willingness to use “Miscellaneous” codes where existing codes are deficient. Since April 2005, TiLite’s Aero Z, TR, TX, XC, YR, ZR and ZRA have all obtained K0009 code verification from the SADMERC.²

Conclusions:

TiLite X and SX wheelchairs present five distinct advantages over K0005 and E1238 wheelchairs:

- (1) By utilizing space-age materials with extremely high strength-to-weight ratios, the TiLite X and SX have significantly lower mass (weight) than K0005 and E1238 wheelchairs.
- (2) Because of the space-age materials that are used, TiLite X and SX wheelchairs are significantly more durable than K0005 and E1238 wheelchairs.
- (3) Because TiLite X and SX wheelchairs are lighter and more customized than K0005 and E1238 wheelchairs, they fit the end user better resulting in improved ergonomics and increased functionality.
- (4) Because TiLite X and SX wheelchairs have improved ergonomics and increased functionality, end users will achieve the maximum degree of independence—they will be able to move faster, negotiate rougher terrain, climb inclines and other obstacles (e.g., door sills) with greater ease, and travel farther.
- (5) Because TiLite X and SX wheelchairs have improved ergonomics and increased functionality, end users will significantly reduce their risk of upper limb injury from long-term manual wheelchair use.

² In March 2004, TiLite filed an application with the HCPCS National Panel to request that the Panel create a new manual wheelchair code for “Sub-20 Lb. Manual Wheelchairs.” The Panel rejected TiLite’s code application for various reasons, among which was the Panel’s view that “due to ongoing work at CMS regarding wheelchair coding, interim coding changes are not being made prior to CMS’ announcement of a revised coding series.” It was further stated that “[w]eight ranges will be considered in the course of ongoing wheelchair coding work.” The recent SADMERC decisions to code various TiLite (and Invacare) wheelchairs as K0009 wheelchairs has the effect of overriding the Panel’s statement in connection with TiLite’s 2004 Code Application that pending a code revision TiLite should use K0005.



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Because of the above advantages and because it is highly likely that the coding structure will be completely revised in the very near future in a manner that recognizes the technological advances of the past decade and the need to provide wheelchair users with extremely light, highly customized products, such as the TiLite X and SX, we believe it is inappropriate to code the TiLite X or SX as K0005 or E1238. Instead, we believe that K0009 (for adult size chairs) or E1229 (for pediatric size chairs) is more suitable until new, more appropriate codes are created. However until the TiLite X and SX are officially code-verified by the SADMERC as K0009/E1229, not all insurers, such as Medicare, will agree with our position and suppliers are cautioned to determine the insurer's position on a case-by-case basis.³

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It is the supplier's obligation to select the proper code and bill an insurer using the code that most accurately describes the product provided to the chair user. Suppliers should refer to authoritative HCPCS lists published by the DMERCS for a complete listing of codes. Suppliers should follow local insurer guidelines, if any, with respect to proper coding, and suppliers should fully comply with the billing requirements set by particular insurers. The existence and use of any code does not guarantee coverage or payment at any level. TiLite does not guarantee that use of the foregoing codes will ensure coverage or payment. The patient's conditions and needs, as well as the insurer's coverage requirements, may impact coverage. Also, accurate medical records' documentation and accurate completion of claims forms can support coverage. TiLite encourages suppliers to contact insurers to confirm compliance with coding and coverage policy. TiLite is available to assist on reimbursement issues for its chairs.