

**Accel™ Low Friction
Thermal Nitanium® Archwires**

Reduced Friction. Accelerated Results.



A Revolution In Sliding Mechanics

Accel Low Friction Thermal *Nitanium* Archwires are the start of a new age in nickel titanium wires. Their reduced friction improves the relationship between brackets and archwires, optimizing the effectiveness of an orthodontic appliance.

Advantages of Accel Low Friction Thermal *Nitanium* Archwires

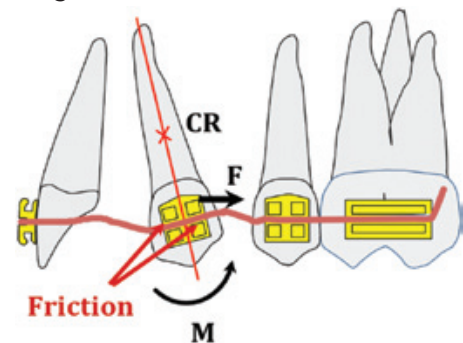
- Increased performance through **30% friction reduction** without affecting the thermal *Nitanium* wire properties*
- Specifically designed to deliver the **optimum tooth moving forces**, providing outstanding resiliency and demonstrating ultimate thermal performance
- Lower friction allows doctors to **reach the finishing stage of treatment sooner** by providing a better sliding mechanism in early- and mid-stage treatment
- **Bright finish** blends in well with brackets, enhancing aesthetic qualities
- **Ideal starting wire** – round for leveling, and rectangular as a first torquing wire
- **Dimpled** midline prevents excessive sliding while maintaining a symmetrical arch shape
- Thermal properties ensure **ease of ligation** in even the most crowded cases
- Available in both the **Pro Form™** and **D-LX™** arch forms to fulfill your treatment objectives

In order to truly understand the benefits of Accel Low Friction Archwires, it is important to examine the effect of friction on arch guided tooth movement. Currently, a great portion of the force being applied to teeth is lost due to friction. This loss of friction is affected by: surface roughness, modulus of the wire, cross section of the wire, and edge bevelling of the wire and the bracket.

Up to 50% of the assigned force of an archwire can be lost due to the friction caused by an archwire moving through a bracket slot. The typical loss of force due to this type of friction is approximately 35% for regular *Nitanium* wires.* Loss of force due to friction produces counter forces that put strain on the anchorage, which is undesirable for the treatment, making treatment planning less predictable and causing additional discomfort for the patient.

Studies have found a correlation between the surface roughness of archwires and their frictional behavior: a rougher surface leads to an increase in friction. Previous attempts to reduce archwire friction include polishing, coating, and burnishing the wire, however, when treating the arches, some of the important material properties were changed or totally lost. Although some previous methods used to reduce friction were successful, they did not attain the remarkably low levels of friction achieved by Accel Wires. The new, proprietary electromechanical treatment developed for these wires considerably improves the surface of *Nitanium* wires without changing the other physical properties. As a result of their refined surface, Accel Wires have been proven to produce up to 30% less friction.

Figure 1:



Tooth-movement along the archwire: Forces occur at contacts between arch and bracket slot, as well as arch and ligatures, leading to a loss of force due to friction.

* Data on file.

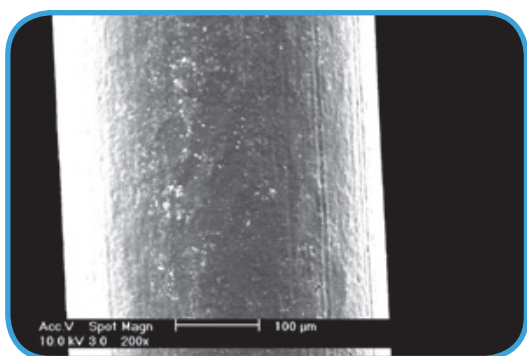
Figure 1 is from an article called "Up to 30% Less Friction", which was published in KN (*Kieferorthopädie Nachrichten*) Magazine in April 2010 (ISSN: 1612-2577). The article was done by Dr. Jan Roehlike, Professor Dr. Bert Braumann, Miriam Meier, Bashir Schatlo, and Professor Dr. Christoph Bouraue.

Revolutionary Electromechanical Treatment Process

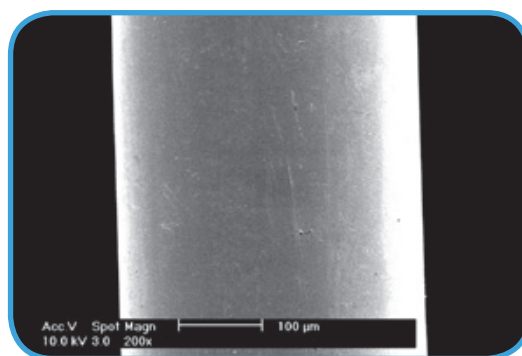
Thorough analysis has confirmed that the electromechanical treatment process conducted on *Accel* Low Friction Archwires preserves the thermal *Nitanium* properties of the wire, without impacting the wire dimensions. Following treatment, the *Accel* Wires showed no negative effects on the material stability in terms of breakage, demonstrating that these wires contain all the positive attributes of classic thermal *Nitanium* wires, with the added benefit of reduced friction.

The images below demonstrate the improved surface finish of *Accel* Wires following the electromechanical treatment process.

Accel Archwires Shown at 200x Magnification

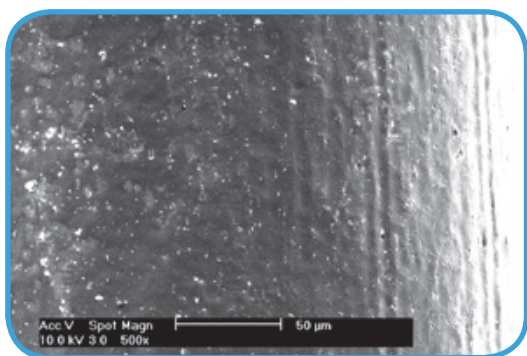


Accel Pre-Treatment

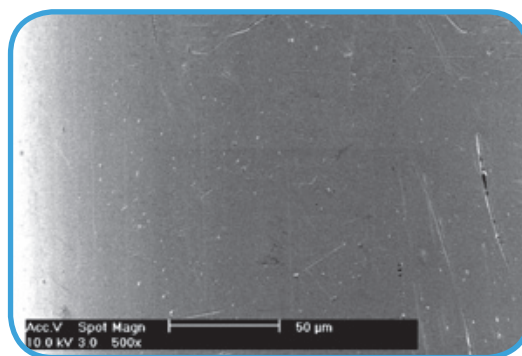


Accel Post-Treatment

Accel Archwires Shown at 500x Magnification



Accel Pre-Treatment

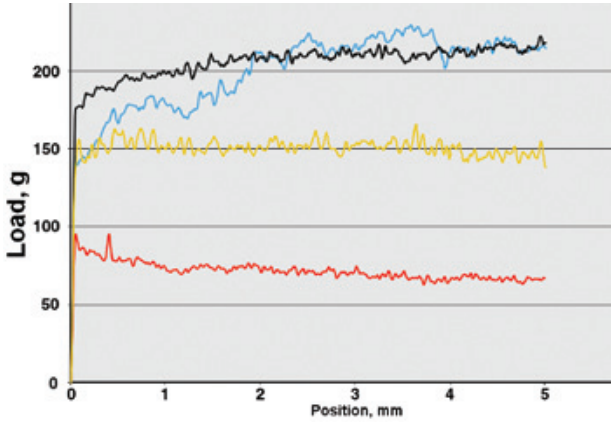


Accel Post-Treatment



Research Done With Accel Low Friction Archwires

Figure 2



Accel Wires Compared to BioForce® IonGuard® Sentalloy® Wires

Figure 2: Illustrates the improvement in friction made to Accel Wires through the surface refining treatment; it also illustrates the significantly higher friction of the BioForce IonGuard Sentalloy Wires versus Accel Low Friction Archwires.

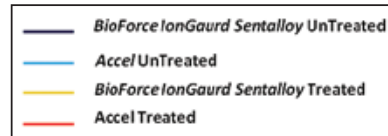
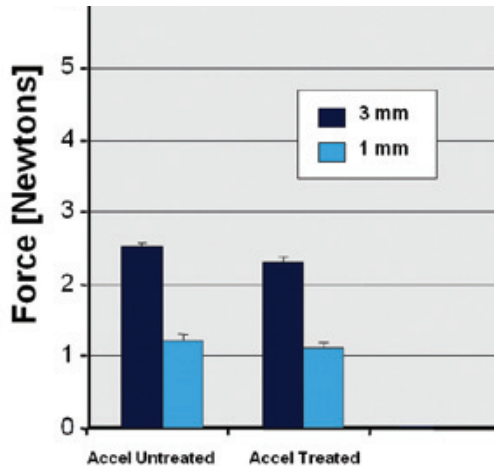


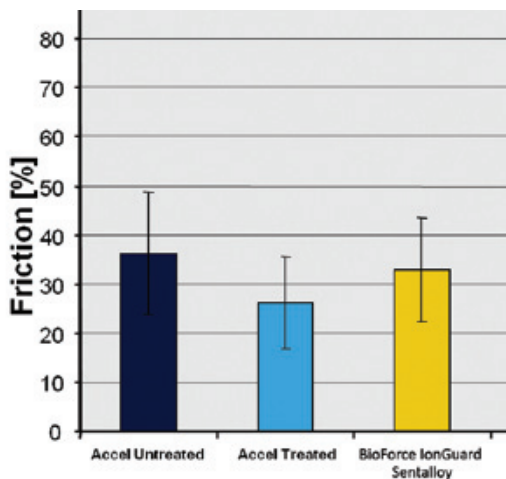
Figure 3



Force Levels Not Affected by Electromechanical Treatment

Figure 3: Illustrates the force levels being delivered during orthodontic treatment by Nitanium (untreated Accel) archwires and Accel Low Friction Archwires. It shows that the force level of Accel Wires is not significantly changed by the electromechanical process used to create the refined surface on the wires. These wires are shown at 3 mm and 1 mm deflection in a three point bending test (ISO/DIN Standard).

Figure 4



Reduced Friction Through Electromechanical Treatment

Figure 4: Illustrates the friction levels of Nitanium (untreated Accel) archwires, BioForce IonGuard Sentalloy Archwires, and Accel Low Friction Archwires. There is a significant difference in friction between the untreated wires and the Accel Low Friction Archwires. Additionally, the Accel Wires demonstrate a noticeably lower friction level than the BioForce IonGuard Sentalloy Wires.

Test results of figure 2 are from an internal study. Data on file.
Test results of figures 3 and 4:
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Treatment With Accel Low Friction Archwires




Accel Low Friction Archwires and Self Ligation

The passive self-ligating brackets developed in recent years are made to minimize friction and its negative effects. However, it is not the brackets that move teeth, it is the wire and its forces. Therefore, a low friction archwire like the Accel Wire is essential for attaining the lowest friction possible, and in turn the most effective tooth moving forces.

The .014" x .025" and .016" x .025" wires are ideal for rotational control when using any active or passive self-ligating bracket system, including the *Carriere*® Self-Ligating Bracket System. The clinical advantages of an Accel Wire can also be realized during the leveling phase with round wires, or as a first torquing wire in the rectangular shape.

Arch Forms and Sizes

Accel Low Friction Thermal Nitium Archwires are available in the *Pro Form* and *D-LX* (comparable to Damon*) Arch Shapes. The universal *D-LX* Wires can be used for both the maxillary and mandibular arches and are packaged in convenient single-pack pouches.

Accel Low Friction Archwires (10 per pack)	 Upper Pro Form	 Lower Pro Form	 Universal D-LX
.012" Dimpled <i>Pro Form</i> Accel Low Friction Thermal Nitium	109-115	109-116	—
.014" Dimpled <i>Pro Form</i> Accel Low Friction Thermal Nitium	109-117	109-118	—
.014" Dimpled <i>D-LX</i> Accel Low Friction Thermal Nitium	—	—	109-134
.016" Dimpled <i>Pro Form</i> Accel Low Friction Thermal Nitium	109-119	109-120	—
.016" Dimpled <i>D-LX</i> Accel Low Friction Thermal Nitium	—	—	109-135
.018" Dimpled <i>Pro Form</i> Accel Low Friction Thermal Nitium	109-121	109-122	—
.018" Dimpled <i>D-LX</i> Accel Low Friction Thermal Nitium	—	—	109-136
.014" x .025" Dimpled <i>Pro Form</i> Accel Low Friction Thermal Nitium	109-123	109-124	—
.014" x .025" Dimpled <i>D-LX</i> Accel Low Friction Thermal Nitium	—	—	109-137
.016" x .025" Dimpled <i>Pro Form</i> Accel Low Friction Thermal Nitium	109-125	109-126	—
.016" x .025" Dimpled <i>D-LX</i> Accel Low Friction Thermal Nitium	—	—	109-138
.017" x .025" Dimpled <i>Pro Form</i> Accel Low Friction Thermal Nitium	109-127	109-128	—
.017" x .025" Dimpled <i>D-LX</i> Accel Low Friction Thermal Nitium	—	—	109-139
.018" x .025" Dimpled <i>Pro Form</i> Accel Low Friction Thermal Nitium	109-129	109-130	—
.018" x .025" Dimpled <i>D-LX</i> Accel Low Friction Thermal Nitium	—	—	109-140
.019" x .025" Dimpled <i>Pro Form</i> Accel Low Friction Thermal Nitium	109-131	109-132	—
.019" x .025" Dimpled <i>D-LX</i> Accel Low Friction Thermal Nitium	—	—	109-141

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