





Tri-Tek Pressure Reduction Technology

^Tri-Tek Pressure Reduction Technology™ is the latest seating design from Gregory Commercial Furniture. Tri-Tek has been in development for over 2 years in conjunction with renowned international ergonomists, occupational therapists and our in-house design team to provide the user with increased support and comfort.

Tri-Tek is proud to have been a finalist in the 2011 Australian International Design Awards and holds the Good Design™ trade mark.

GCF designed Tri-Tek by conducting the following investigations:

- Research
- Industry Experience to enhance the design
- User Trials
- Pressure Sensor Pad Trials

Research

'Up to 90% of people have poor posture, which puts extra pressure on the spine and can lead to fatigue, back pain and headaches.

Bad posture can also compress internal organs, resulting in issues such as respiratory problems, chest tightness, high blood pressure and poor digestion.

We do know that the skin and fat tissues under the ischial tuberosities or 'sitting bones' is less sensitive to pressure than the muscle tissue surrounding the tuberosities and better suited to carrying load than the other tissues of the buttocks and thighs*.'

'When a seated posture is assumed the majority of the body's weight is placed upon the supporting area of the ischial tuberosities of the pelvis and the tissues in their proximity**.'

'As a person sits the pelvis rotates backwards, the lumbar spine may flatten, and the ischial tuberosities become the main weight-bearing structure in close contact with the seating surface***.'

'The Journal of the Royal Society of Medicine 2008 concludes that prolonged seated immobility at work may represent a risk factor for VTE (Venous Thromboembolism) and Deep Vein Thrombosis (DVT).'



- 1 The tear drop shape represents internal foam cores and highlights where your Ischial Tuberosities should sit.
- 2 Pommel at the front discourages user crossing legs. The unique waterfall front reduces pressure under the thighs

What did the research tell us?

Design a chair that:

- Improves blood circulation around the lower extremities.
- Focus the weight loading under the ischial tuberosities where there is less tissue and arteries.
- Balances weight correctly to assist in opening the pelvis and promote a healthy 'S' curve in the spine by balancing the head, spine and pelvis.

Design

Tri-Tek Pressure Reduction Technology™ is focused on providing the user with increased support and comfort. The design of Tri-Tek is to improve blood circulation by focusing the weight distribution under the ischial tuberosities which corrects the distribution of seated pressure.

Specific attention was given to the design of the tear drop shape inner foam cores which assist in the main weight loading over the ischial tuberosities. The cores encourage even weight distribution and the forward tilt of the pelvis, which promotes a healthy 'S' curve in the spine.

Tri-Tek is made up of 3 unique foam cores that vary in shape and by up to 20% in foam density. The unique shaping of the tear drop foam cores effectively provides an innovative flexible movement that improves the transition across the different densities.

The unique contouring of the seat surface encourages the thigh to sit correctly and promotes a forward seat tilt whilst the seat is flat. The seat angle assists with opening the pelvis angle which balances the head, spine and pelvis and promotes a healthy 'S' curve in the spine. The pommel at the front discourages the user from crossing their legs which reduces circulation to the lower extremities.

Of significant importance is the unique waterfall shape front of the seat which alleviates pressure under the thigh which then encourages blood circulation through the lower extremities.

Tri-Tek Pressure Reduction Technology™ is easily recognisable due to the visual cue of the tear drop shape internal foam cores.



*(Reed et al. 1994),**(Schoberth, 1962; Chaffin et al.,1999), ***(Andersson et al.,1979; Congleton et al., 1988; Chaffin et al., 199; Sember, 1994).

^International Patent Application No. PCT/AU2010/001715

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User Trials

In 2010 GCF began user trials for Tri-Tek in Australia and in New Zealand. The NZ trials were overseen by Prof T W Cunniffe PhD, FIEHF, MDINZ - Patron Member NZErg.

The user trial group consisted of a cross section of different height and weight users and their activities were a mix of computer and clerical duties. As part of the user trial it was a requirement that all participants spent the majority of their work time sitting.

The users were provided with a Tri-Tek ergonomic chair for trialing for 10 days.

The participants recorded their comfort rating every hour whilst sitting on the Tri-Tek seat.

98% of the group found the Tri-Tek seat very comfortable and in fact some of the users had chronic back pain and by sitting on a Tri-Tek seat their back pain disappeared. One user had DVT and found sitting on Tri-Tek improved their



condition. The users also noted that the range of options available provided for a variety of different height and weight users.

Leading Physiotherapists and Occupational Therapists also assessed the chairs on a more technical level Cheryl Wegner from Safety Matters comments were:

"Tri-Tek cushion positioned with seat pan parallel to the floor was observed to increase the hip angle of the user to slightly greater than 90 degrees due to the increased cushion density underneath the sitting bones, and cushion sloping away towards the front of the seat pan (thus raising the ischial tuberosities slightly higher than the knees).

Many ergonomic researchers are in agreement that open hip angles (angles greater than 90 degrees) and reclining postures results in less lumbar pressure, however a subjective observation on my part through years of assessing sitting postures at workstations is that when the spine is upright with head balanced on top of the spine, an improved spine balance can be achieved by angling the seat pan forward (opening the hip angle) rather than reclining the chair back, as a forward sloping seat pan supports a more standing like posture of the spine and maintains an upright balance of the spine, allowing workers to easily access their workstation equipment without reaching, and subsequent static loading of muscles of their upper arms / shoulders, upper back and neck, potentially resulting in other musculoskeletal issues."

These assessments, the user trial feedback and detailed evaluations from industry professionals have provided GCF with valuable feedback to refine the seat technology design even further.

“some of the users had chronic back pain and by sitting on a Tri-Tek seat their back pain disappeared”



Key Features and Benefits of Tri-Tek Pressure Reduction Technology™

- In most office chairs the body weight is spread throughout the seat pan thus restricting blood flow to the lower extremities. Tri-Tek reduces pressure under the thigh by centralising the weight to under the ischial tuberosities (sitting bones) where there is less tissue and arteries.
- The unique contouring of the seat and waterfall front acts as a forward seat tilt without feeling like you are slipping out of the chair. This assists to open the pelvis and balance your head, spine and pelvis and promote a healthy 'S' curve in the spine.
- The tear drop shape internal foam cores placed under the ischial tuberosities are contoured internally to 'flex' which balances the weight of the user to under the ischial tuberosities therefore promoting a healthy 'S' curve in the spine.
- Moulded foam seat with anti-bacteriaside.
- ^Patented design

[^]International Patent Application No. PCT/AU2010/001715



“Tri-Tek will assist with improving your well being and posture”



Tri-Tek Pressure Reduction Technology sensor trial

Sensor Pad Trials

GCF are pioneers in ergonomic seat foam technology. As part of the user trial evaluation GCF invested in pressure sensor pads to conduct supervised in house testing. The pressure sensor pads provided us with valuable data on peak pressure area and how weight is distributed whilst pressure is applied.

The sensor pad trial was conducted at our Sydney office and was overseen by Cheryl Wegner, Director of Safety Matters.

Cheryl has a Bachelor of Science in Occupational Therapy and a Masters in Safety Science from the University of New South Wales and is a member of the Australian Occupational Therapy Association and the Australian Ergonomic Association.

With over 20 years experience as an Occupational Therapist Cheryl has extensive knowledge in a variety of medical fields and now specializes in occupational health and safety, ergonomics and injury management.

The sensor pad trial was conducted with one person assessed whilst seated in an ordinary seat then sitting

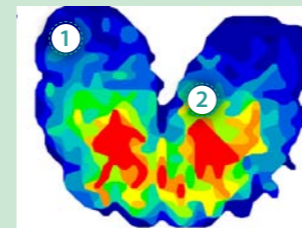
in a Tri-Tek Pressure Reduction Technology™ seat.

As you can see from the following results whilst sitting on a Tri-Tek seat the pressure load under the thigh area ¹ is very low compared to an ordinary seat foam ³. Reduced pressure under the thigh area has been proved to increase blood circulation through the legs and back to the heart.

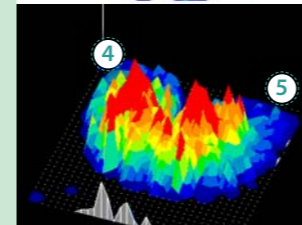
You will also notice from the sensor pad images that the pressure readings ² are focused around the ischial tuberosities (sitting bones). It has been proved that there is less tissue and arteries under the ischial tuberosities which is why concentrating the majority of your seated weight in this area will assist with better circulation to your lower extremities and back to the heart.

It was also identified by Cheryl Wegner that due to the contouring of the seat surface and the placement of the unique tear drop shape internal foam cores under the ischial tuberosities (sitting bones) that sitting in the chair with a flat seat assisted with tilting the pelvis which promotes the healthy 'S' curve in the spine.

With Tri-Tek Pressure Reduction Technology™

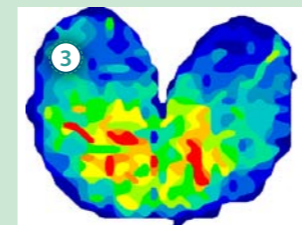


Tri-Tek Pressure Reduction Technology sensor trial, image 1

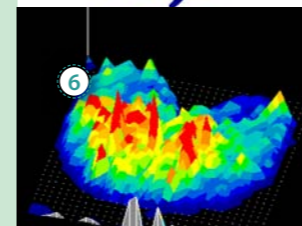


Red area ⁴ represents the peak pressure area of heaviest weight loading. This is where the ischial tuberosities (sitting bones) are located. Dark Blue ⁵ shows the least weight loading.

Without Tri-Tek Pressure Reduction Technology™



Ordinary seat foam sensor trial, image 2



Reduced red area ⁶ indicates that the peak pressure area weight loading is spread over a larger area with increased pressure under the thigh area.

To create the same pelvic tilt in the ordinary seat we needed to tilt the angle of the ordinary seat forward considerably which then resulted in the user slipping forward and out of the chair.

As with all desk bound activities GCF strongly encourages people to regularly take breaks and walk around to encourage blood circulation.

You can be confident that whilst sitting in GCF's Tri-Tek seat not only will you be sitting in luxury but Tri-Tek will assist with improving your well being and posture.

As an added safe guard GCF has included an anti-bacteriaside in the seat foam to reduce the risk of bacteria spreading in the Tri-Tek seat.

Tri-Tek Pressure Reduction Technology™ is available in the MYCHAIR™ program from GCF.

MYCHAIR™ provides the user with the ability to develop a complete chair to suit their individual needs.

To trial a Tri-Tek pressure reduction technology chair contact:

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