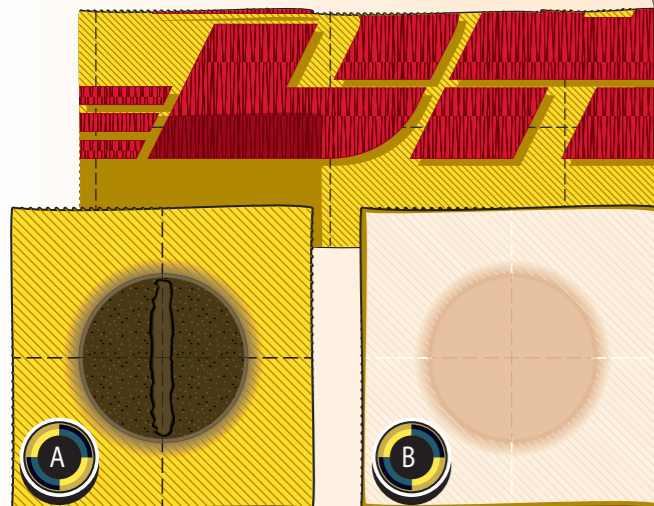


One of the prime safety concerns in auto racing is protecting drivers and race personnel from the dangers of fire. Incidents in recent years, serve to remind everyone involved that no matter what precautions are taken, the dangers of fire can never be fully eliminated.

Every precaution is taken to maximise protection. The colorful clothing seen in pit lane is the product of extensive research and development.

Material facts: Driver and pit-crew suits are tailored exclusively from lightweight woven Nomex fibers. Embroidered logos are stitched with Nomex thread on the outer layer only, to preserve suit integrity. In a fire cotton, thread can ignite and act as a heat conductor.



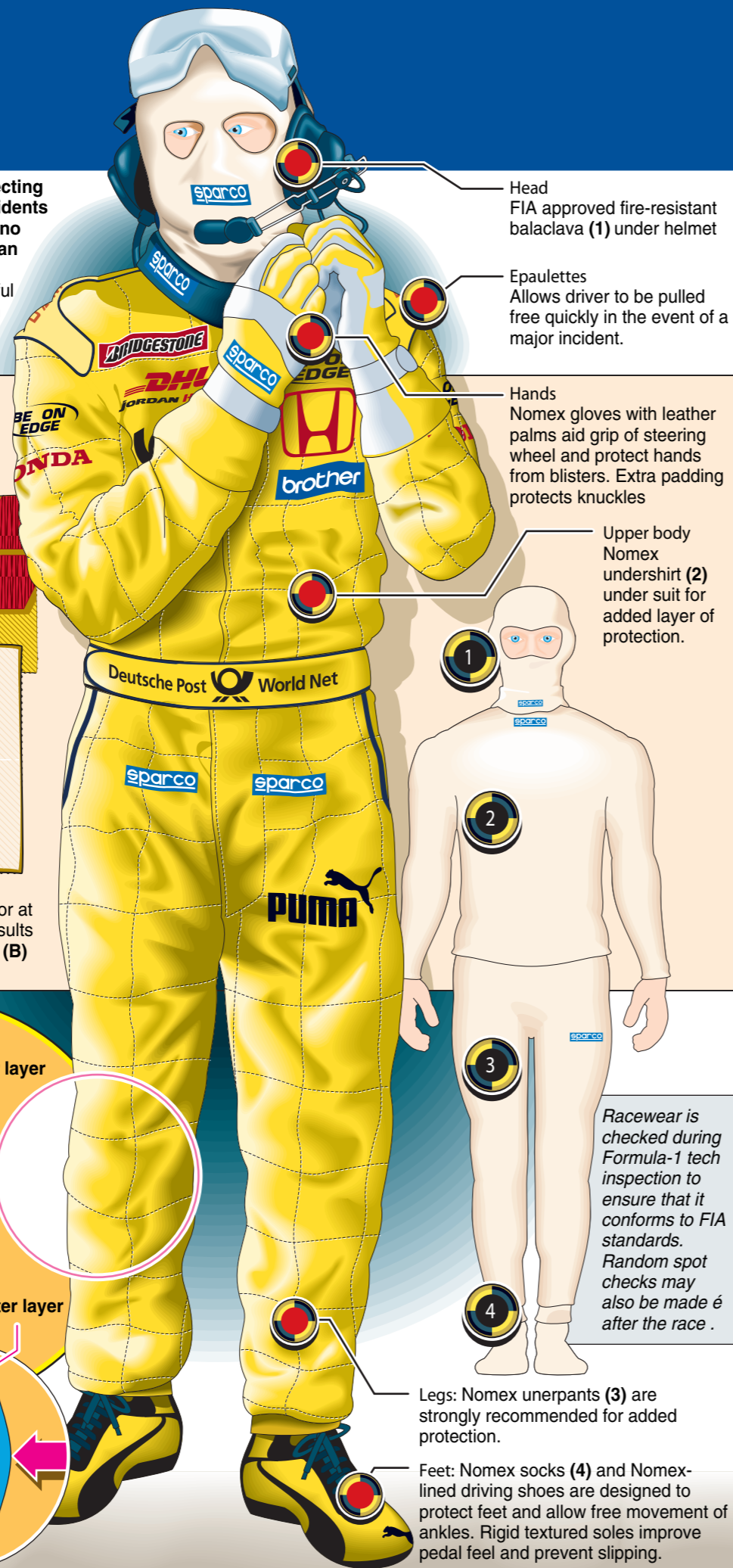
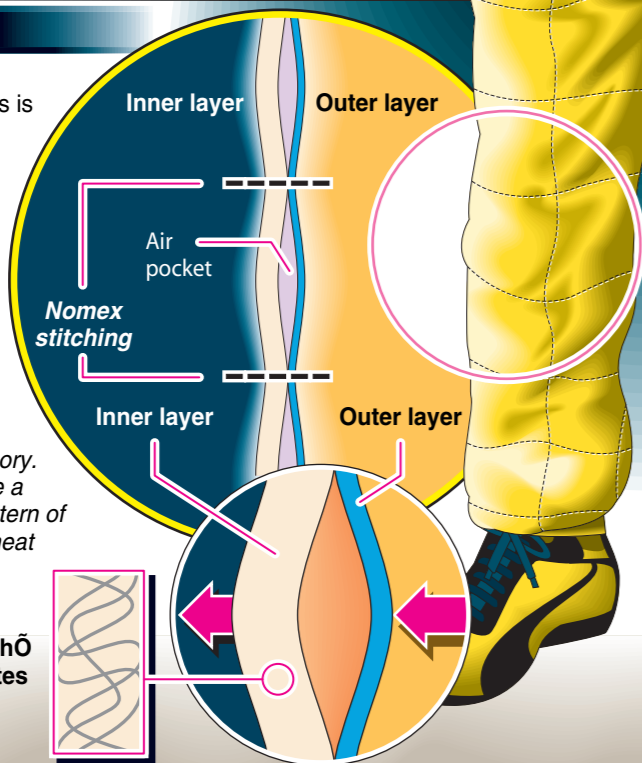
Evidence of heat: In a controlled test, an 800°C liquid propane flame is blasted on to a section of driver's overalls for at least 12 seconds (time specified by FIA regulations). This results in severe burning to the outer layer (A), while the inner layer (B) sustains only moderate signs of thermal heat transfer.

Air dynamics

The box-quilted Nomex stitching on Sparco suits is more than just a nice pattern! Stitching the layers together in this way creates hundreds of small air pockets. Because heat transfer through air is much slower than by direct contact, each pocket dramatically slows the effects of external fire.

A simple test of this theory. Next time you barbecue a steak, check for the pattern of the grill burnt into the meat where there has been direct contact!

Corrugated Osandwich® weave of Nomex creates millions of tiny air pockets



Head
FIA approved fire-resistant balaclava (1) under helmet

Epaulettes
Allows driver to be pulled free quickly in the event of a major incident.

Hands
Nomex gloves with leather palms aid grip of steering wheel and protect hands from blisters. Extra padding protects knuckles

Upper body
Nomex undershirt (2) under suit for added layer of protection.

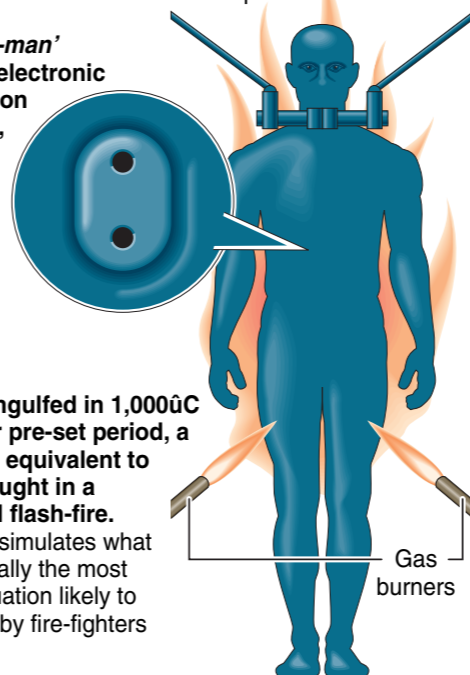
Racewear is checked during Formula-1 tech inspection to ensure that it conforms to FIA standards. Random spot checks may also be made after the race.

Legs: Nomex unerpants (3) are strongly recommended for added protection.

Feet: Nomex socks (4) and Nomex-lined driving shoes are designed to protect feet and allow free movement of ankles. Rigid textured soles improve pedal feel and prevent slipping.

Introducing...Thermo-man: Du Pont, the manufacturers of Nomex, carry out exhaustive tests on suits whether for F1 drivers or fire-fighters using a life-sized mannequin, equipped with computer-linked sensors. The analyzed test data from *Thermo-man* is used to calculate simulated burn patterns

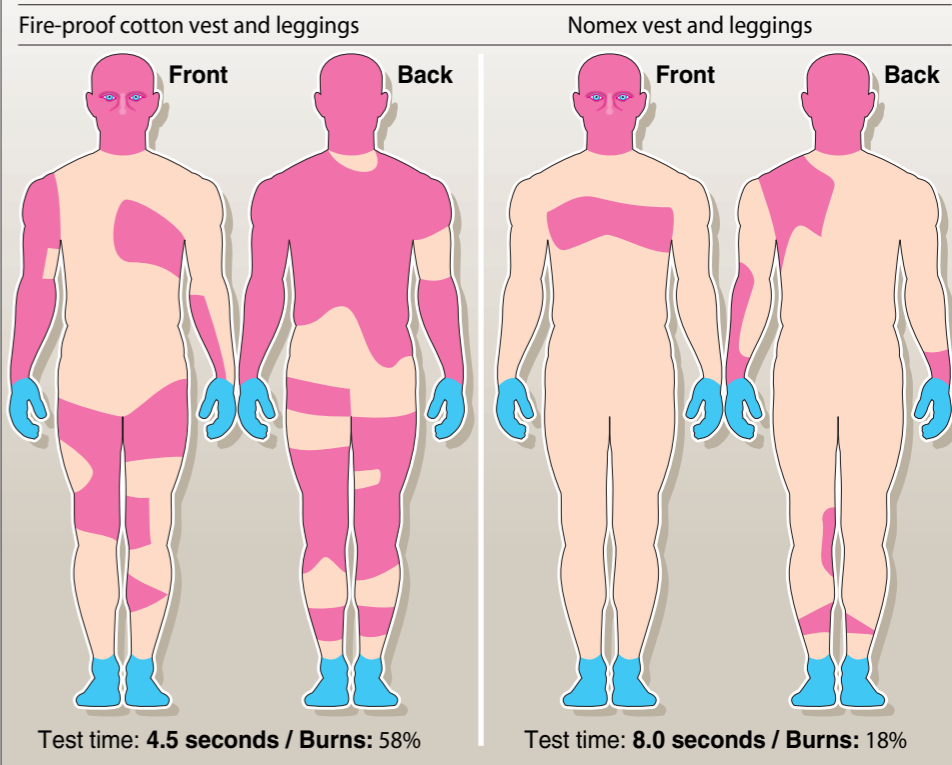
'Thermo-man' has 120 electronic sensors on his head, torso, arms and legs



Suit is engulfed in 1,000°C flame for pre-set period, a scenario equivalent to being caught in a chemical flash-fire. This test simulates what is potentially the most lethal situation likely to be faced by fire-fighters

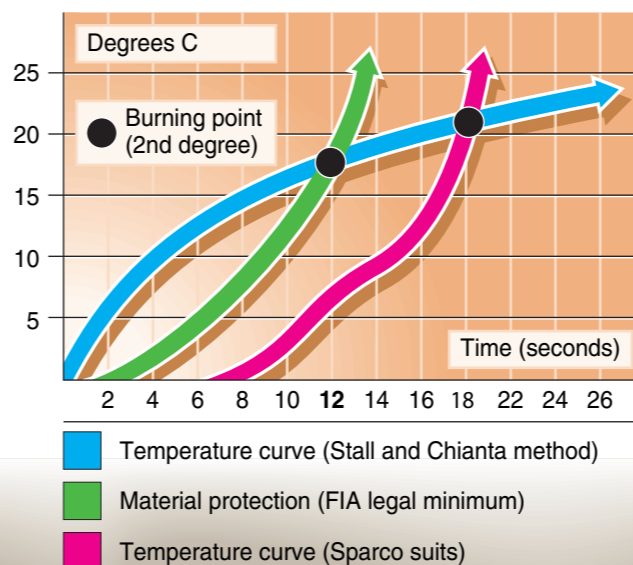
Legend: Unharmd (white), 2nd and 3rd degree burns (pink), Unharmd (blue)

The figures below illustrate average results of comparisons between fire-proof cotton and Nomex body coverings, illustrating the heat restraining properties of F1 drivers clothing. Nomex's stability in intense heat prevents shrinking on to the body, which accelerates heat transfer. The cotton's fire-proofing may also generate toxic fumes when fabric ignites



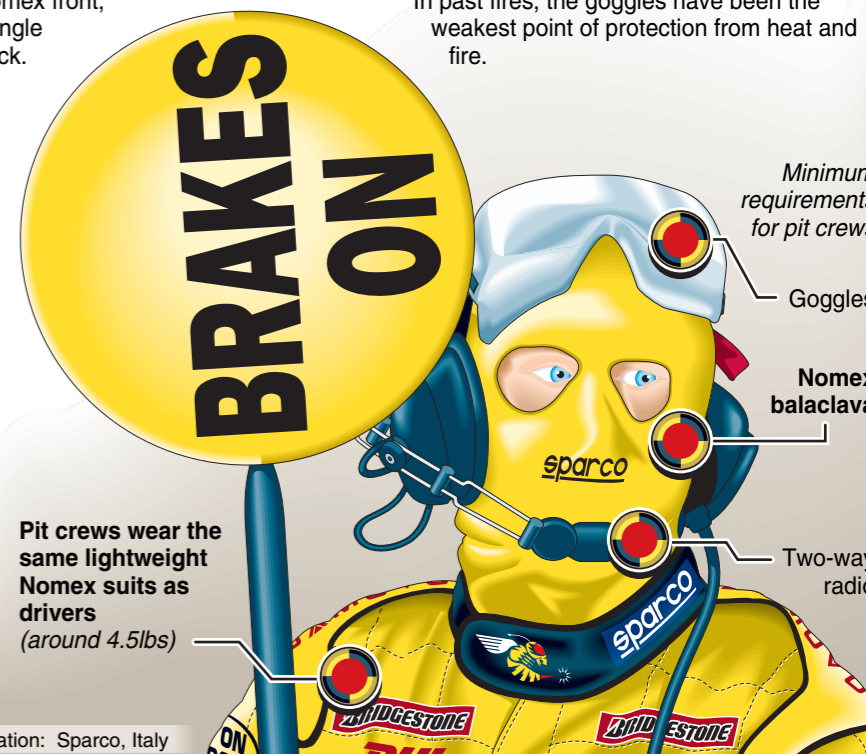
Fire insurance: Regulations surrounding driver safety are rigid and precise. Before a driver is granted a Super Licence permitting participation in F1 he must satisfy certain criteria. One of these is that in full racewear, with seat-belts properly secured and padding in place, he must be able to evacuate the cockpit and place one foot on the ground within five seconds. Rules on clothing demand that overalls and underwear should protect a driver from second degree burns for at least twelve seconds.

Scale of protection...



Crew cuts: Pit stop crews are essentially protected by the same clothing as drivers. The key exception is in headwear, where many crews opt for just wearing balaclavas. These have double eye-holes and are formed of a two-layer Nomex front, with a single layer back.

Nomex is the registered trade-mark of DuPont
The weak link... Protective goggles now carry a layer of transparent film to reflect heat in the event of fire but, while saving eyes from dirt and splashes, they cannot offer the same high levels of protection as the clothing. In past fires, the goggles have been the weakest point of protection from heat and fire.



Pit crews wear the same lightweight Nomex suits as drivers (around 4.5lbs)

Minimum requirements for pit crews

Goggles

Nomex balaclava

Two-way radio