Thermal Effect on Trauma Patient
Comparison Ferno Scoop 65EXL vs Aluminum scoop

The contuctivity of the scoops body panels building material is different with the same area.
Considering the trauma patient lke a inert thermal solid we can compare the thermal transfer between body and scoops.

Conductive Heat Transfer

Conduction will take place if there exist a temperature gradient in a solid medium.

Energy is transferred from more energetic to less energetic molecules when neighboring molecules collide. Conductive heat flow occur in direction of the decreasing temperature since higher temperature are associated with higher molecular energy.

Fourier's Law express conductive heat transfer as

$$q = k\ A\ dT / s$$

where

q = heat transferred per unit time (W, Btu/hr)

A = heat transfer area (m^2, ft^2)

k = thermal conductivity of the material (*W/m.K or W/m ^oC, Btu/(hr ^oF ft^2/ft))*

dT = temperature difference across the material (K or ^oC, ^oF)

s = material thickness (m, ft)

Example - Heat Transfer by Conduction

A plane wall constructed of solid iron with thermal conductivity *70 W/m^oC,* thickness *50 mm* and with surface area *1 m by 1 m,* temperature *150 ^oC* on one side and *80^oC* on the other. Conductive heat transfer can be calculated as:

q = (70 W/m^oC) (1 m) (1 m) ((150 ^oC) - (80 ^oC)) / (0.05 m)

q = 98 kW

Thermal Conductivity - *k - (W/mK)*	
Material/Substance	Temperature *(^oC)*
	25
Aluminum	250
Cotton	0.03
Cotton Wool insulation	0.029
Polyethylene HD	0.42 - 0.51

1 W/(m K) = 1 W/(m^o C) = 0.85984 kcal/(h m ^{o}C) = 0.5779 Btu/(ft h ^{o}F)

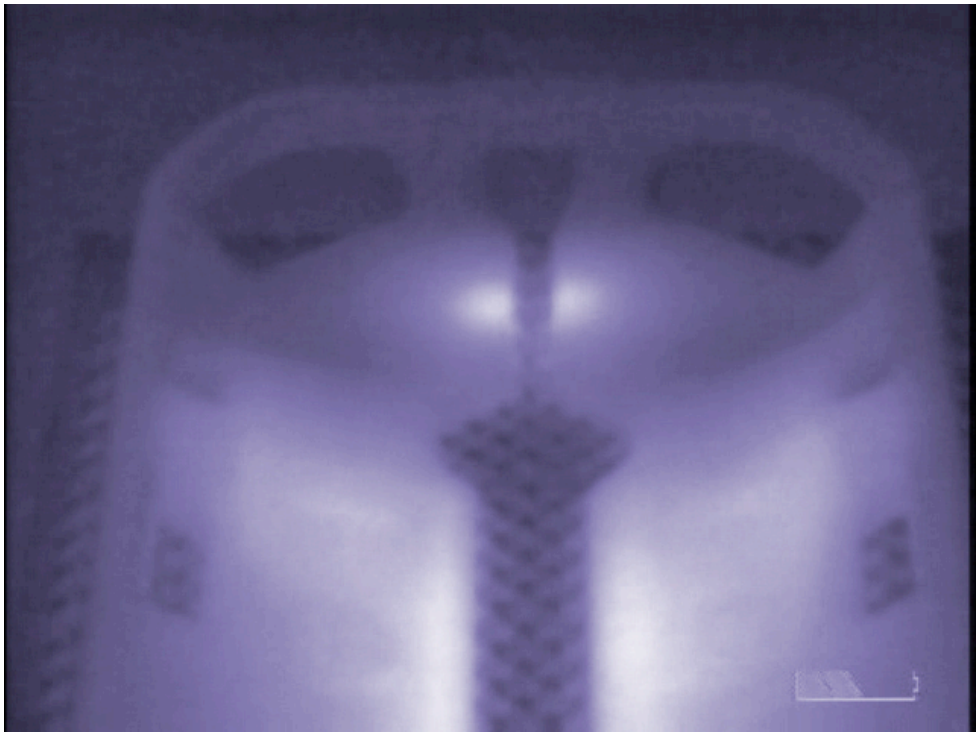
Applying the same Fourier's Law to the scoop stretchers you can compare as follow:

Scoop 65exl (HDPE)
q = (0.5 W/m^{o}C) (0.56 m^{2}) ((36 ^{o}C) - (10 ^{o}C)) / (0,.05 m)

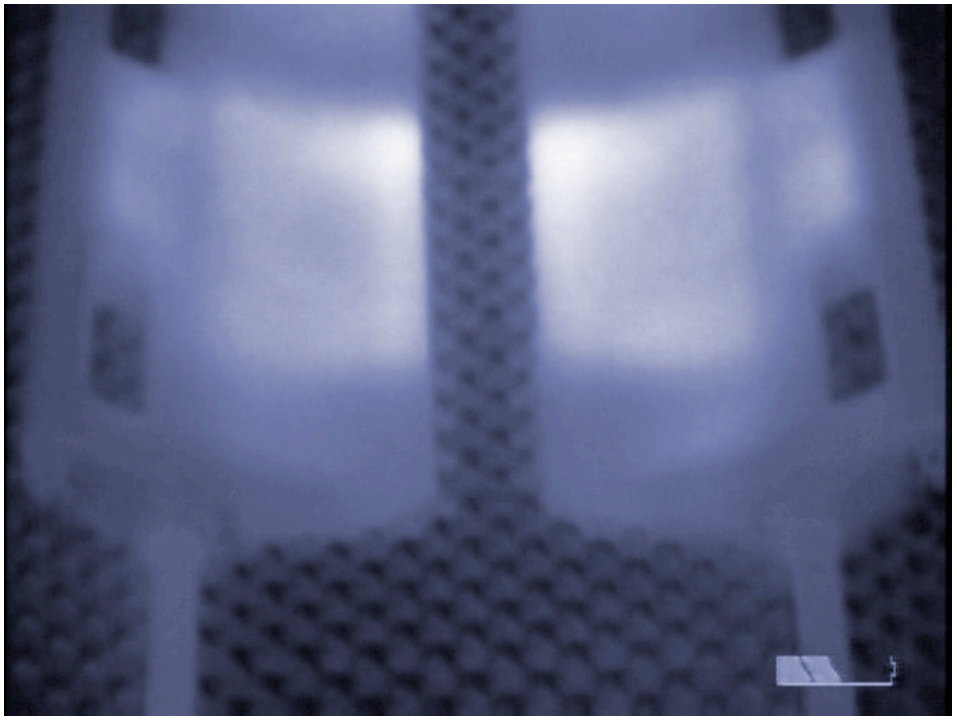
Scoop 65exl hdpe q= 1456 W

Scoop 65 (aluminum)
q = (250 W/m^{o}C) (0.56 m^{2}) ((36 ^{o}C) - (10 ^{o}C)) / (0,.05 m)

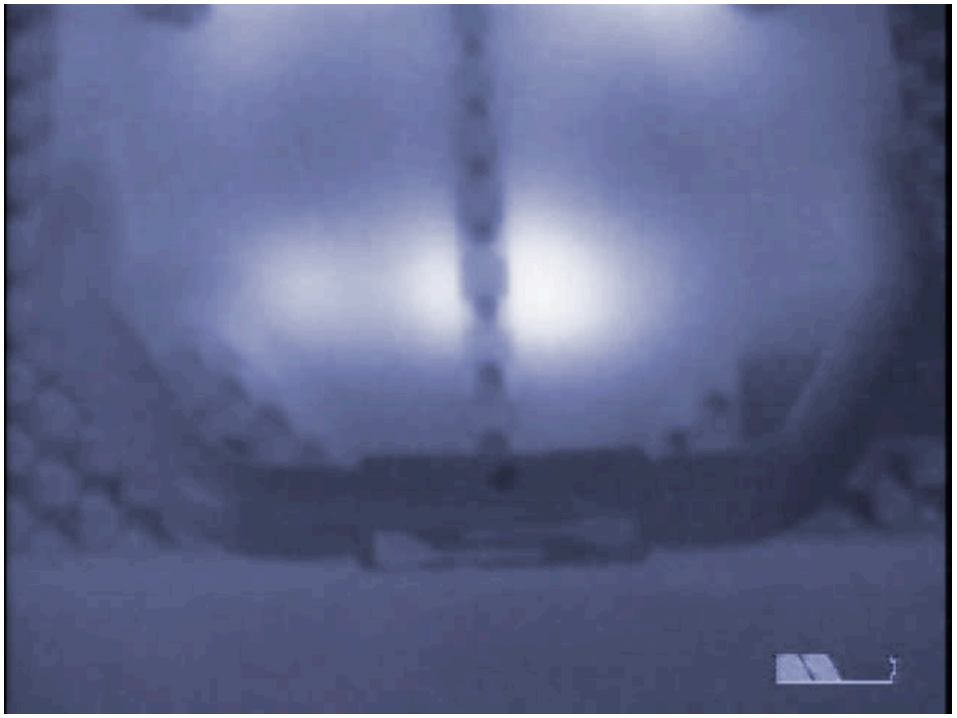
Scoop 65 Aluminum q= 728000 W



Heat body distribution on scoop 65exl - head area



Heat body distribution on scoop 65exl - pelvic area



Heat body distribution on scoop 65exl - feet area

Conclusion:

The HDPE scoop stretcher allow a better thermal protection of a Trauma Patient.