



Cutaneous Burn at an Elevated Ambient Air Temperature

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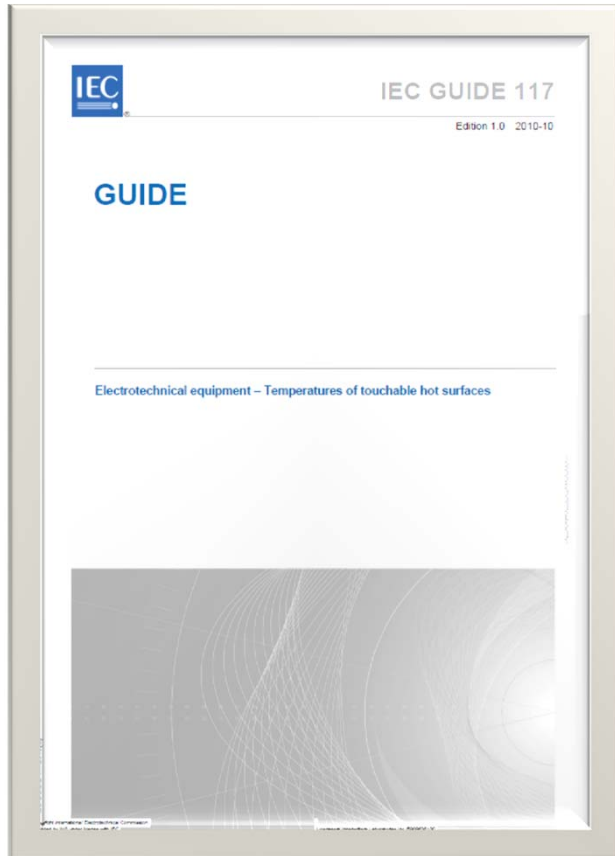


100°C

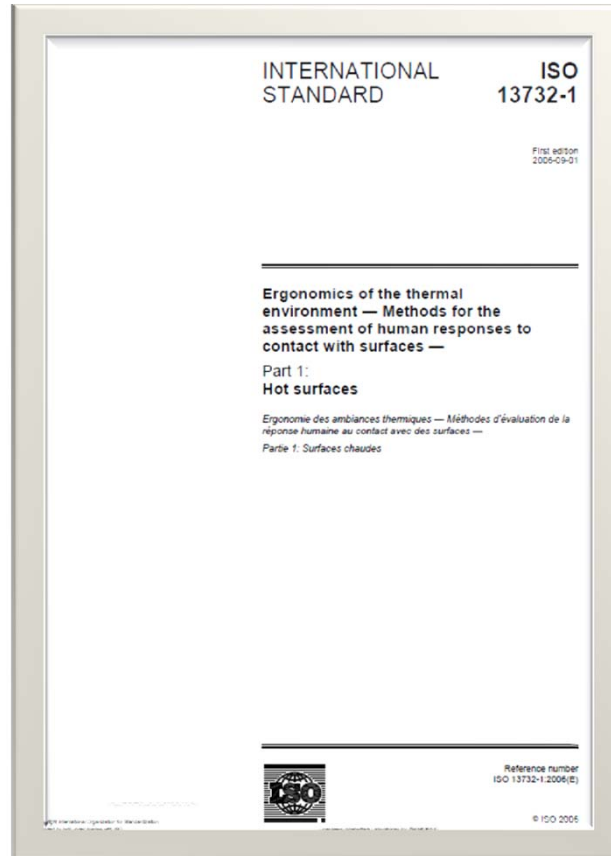
25°C

40°C

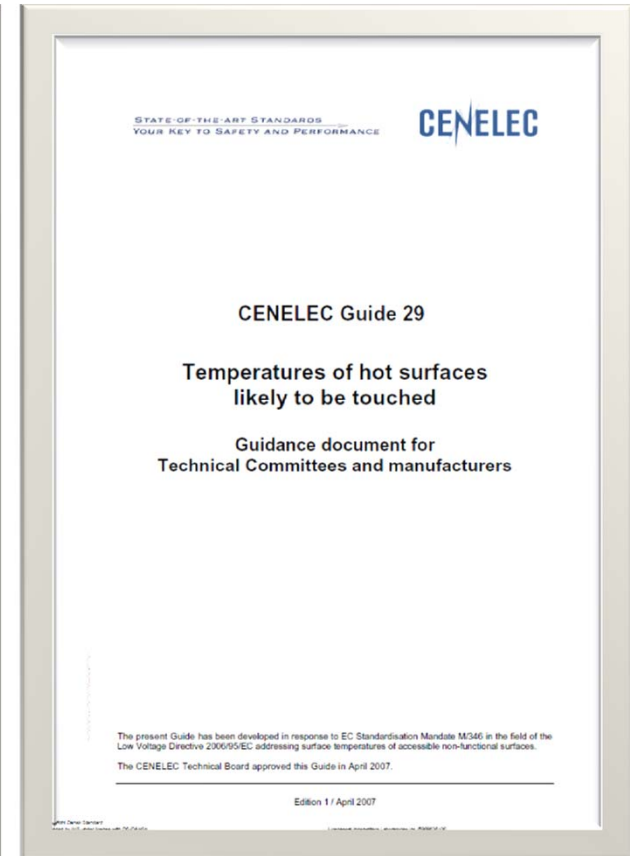
standards about cutaneous burn



IEC GUIDE 117
2010



ISO 13732-1
2006



CELELEC GUIDE 29
2007



ISO 13732-1:2006(E)

3.2 surface temperature

T_s

temperature of a material's surface

NOTE Surface temperature is expressed in degrees Celsius (°C).

CENELEC Guide 29

Temperatures of hot surfaces likely to be touched

3.1 surface temperature (T_s)

temperature of a surface, measured in degrees Celsius, at an ambient temperature of $25^{\circ}\text{C} -5^{\circ}\text{C}/+0^{\circ}\text{C}$

Guide 117 © IEC:2010(E)

3.7 surface temperature

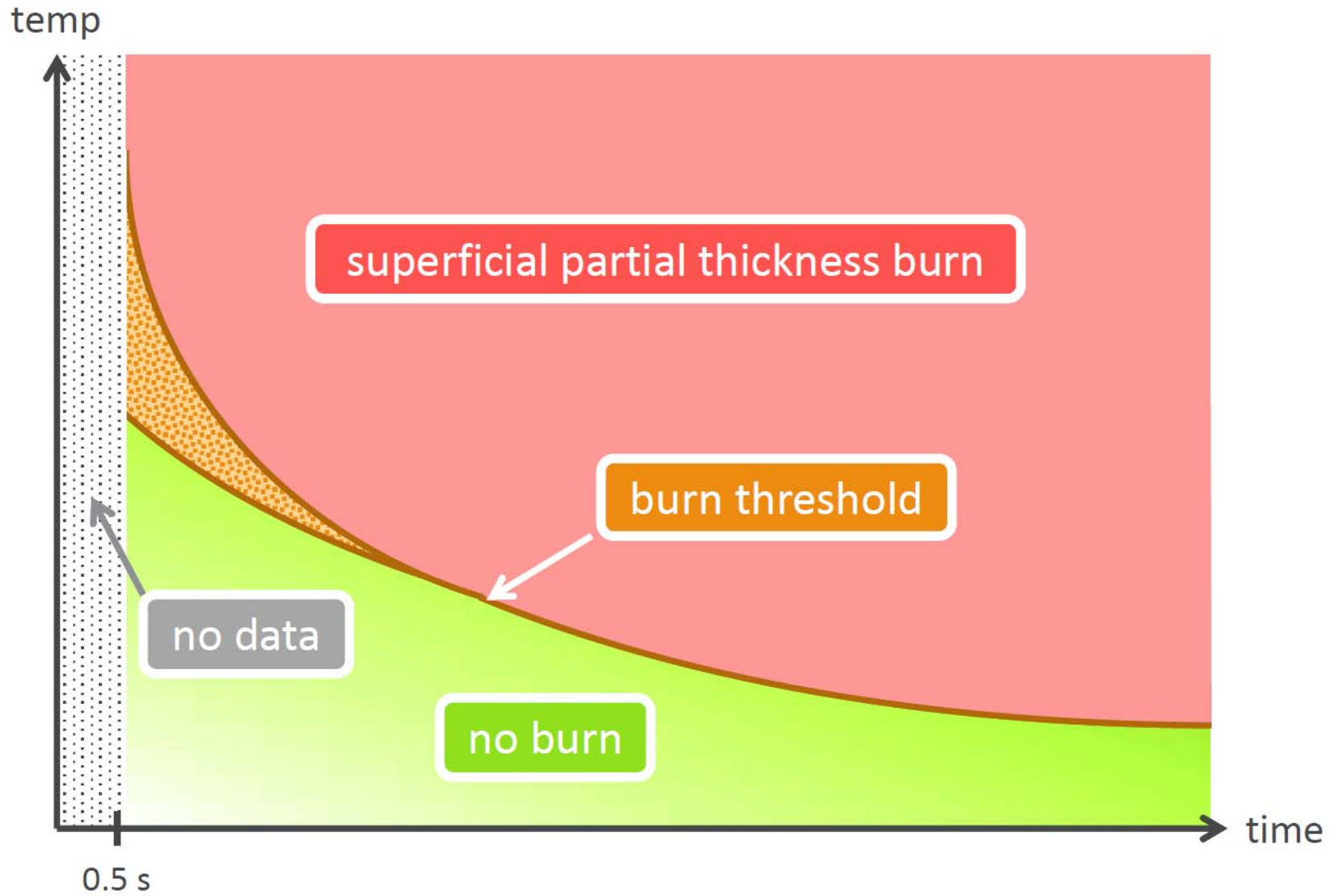
temperature of a surface, measured in degrees Celsius, at an ambient temperature of $25_{+0}^{-5} \text{ }^{\circ}\text{C}$.

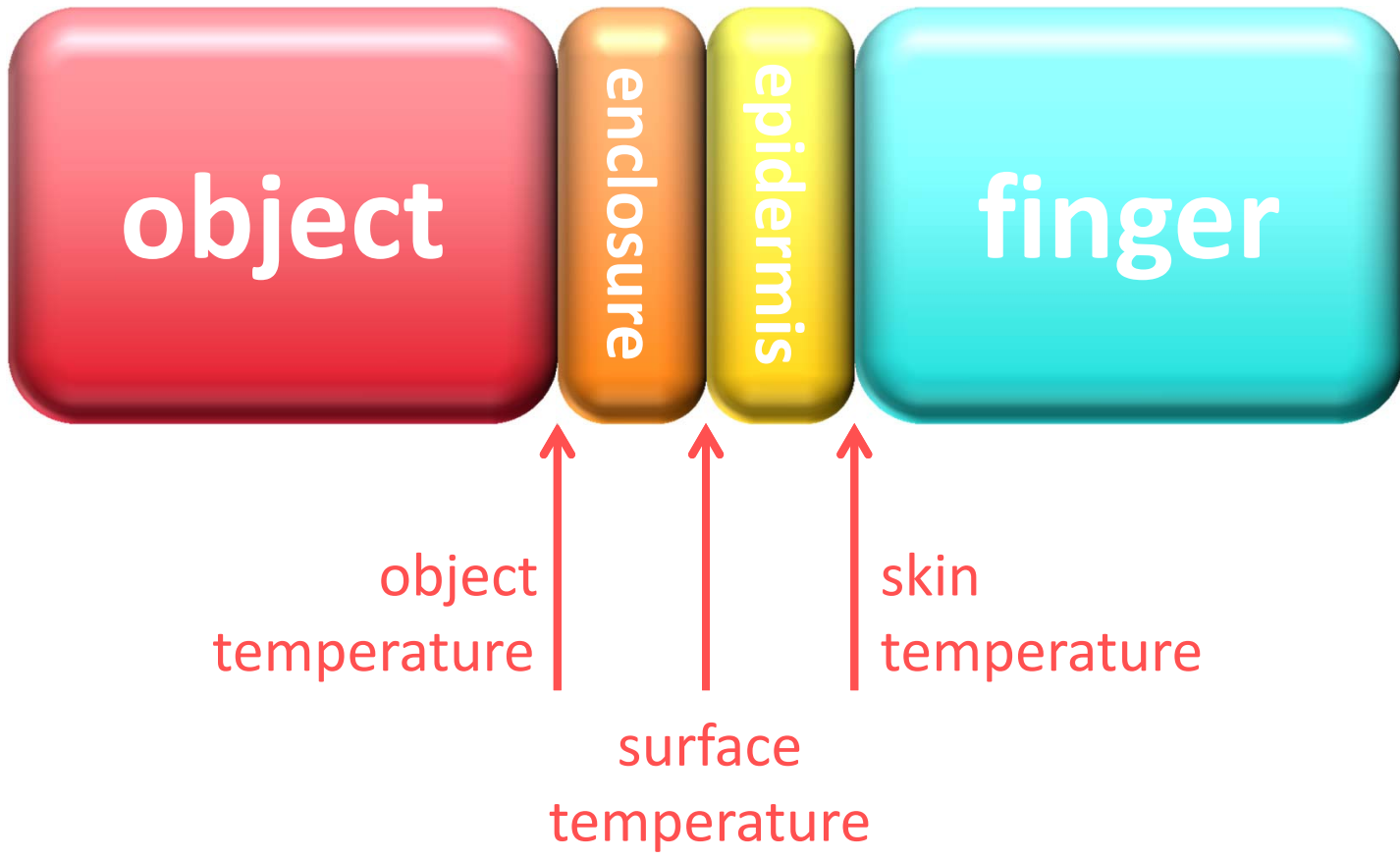


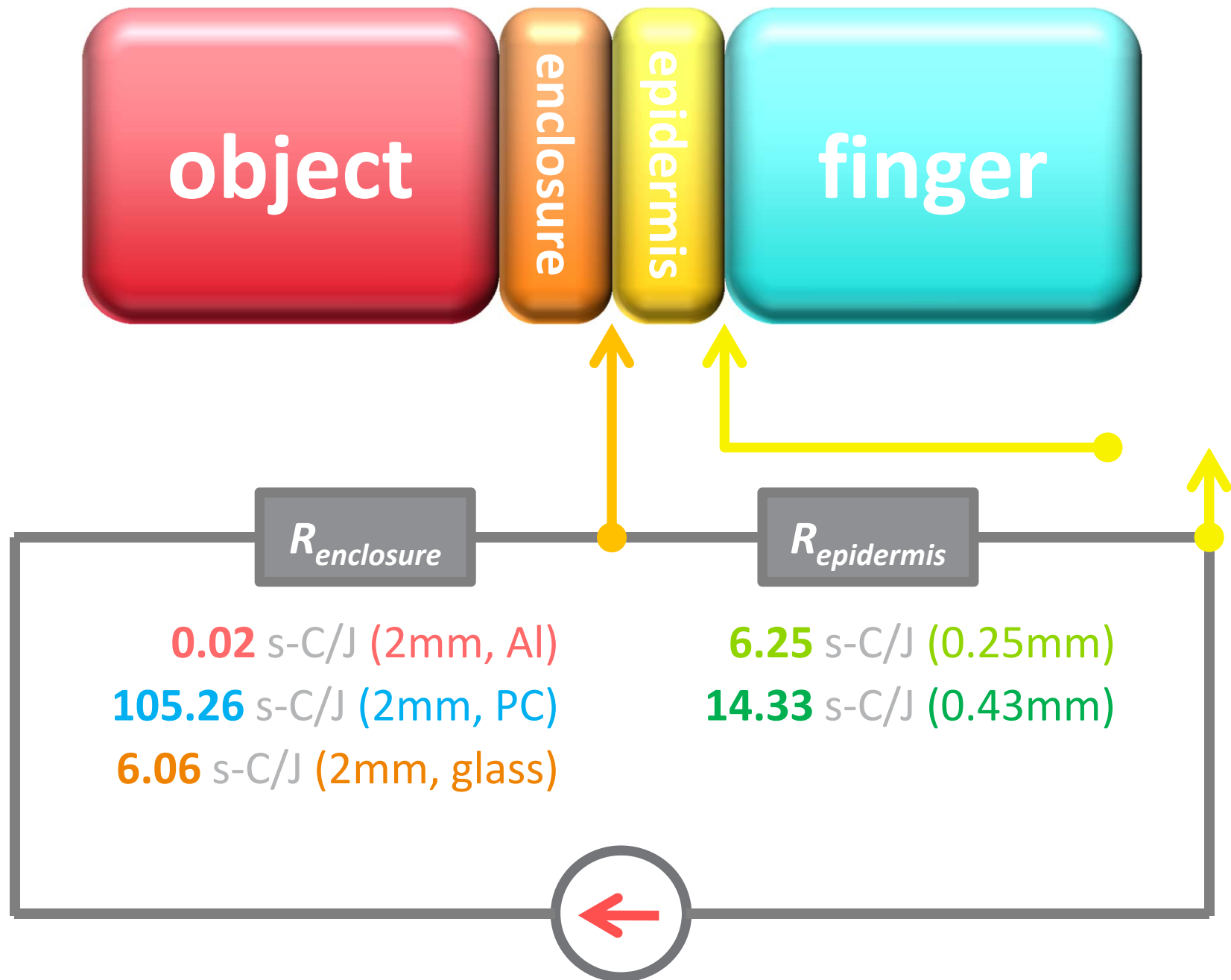
assessing the risk of cutaneous burn (IEC GUIDE 117)

1. identification of surfaces.
2. task assessment.
 - probability of contact.
3. measurement of surfaces temperatures.
4. choice of applicable burn threshold.
5. comparison between highest surface temperature and the burn threshold.
 - severity of harm.
6. result of the risk assessment.



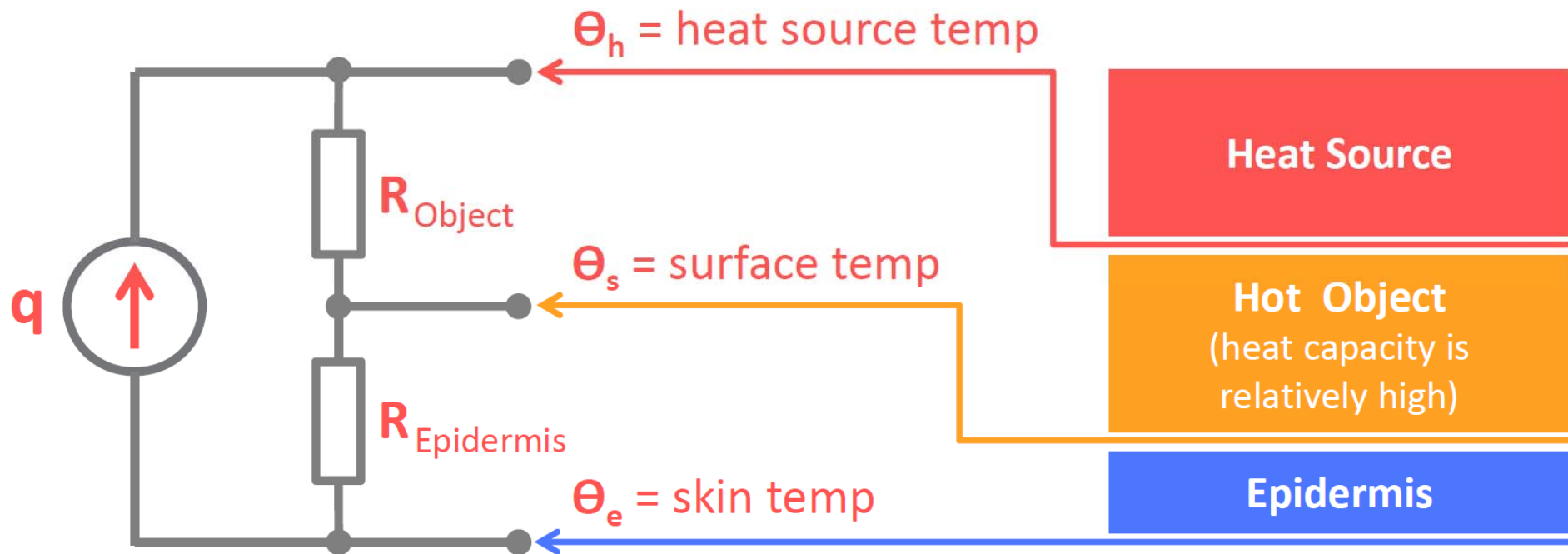






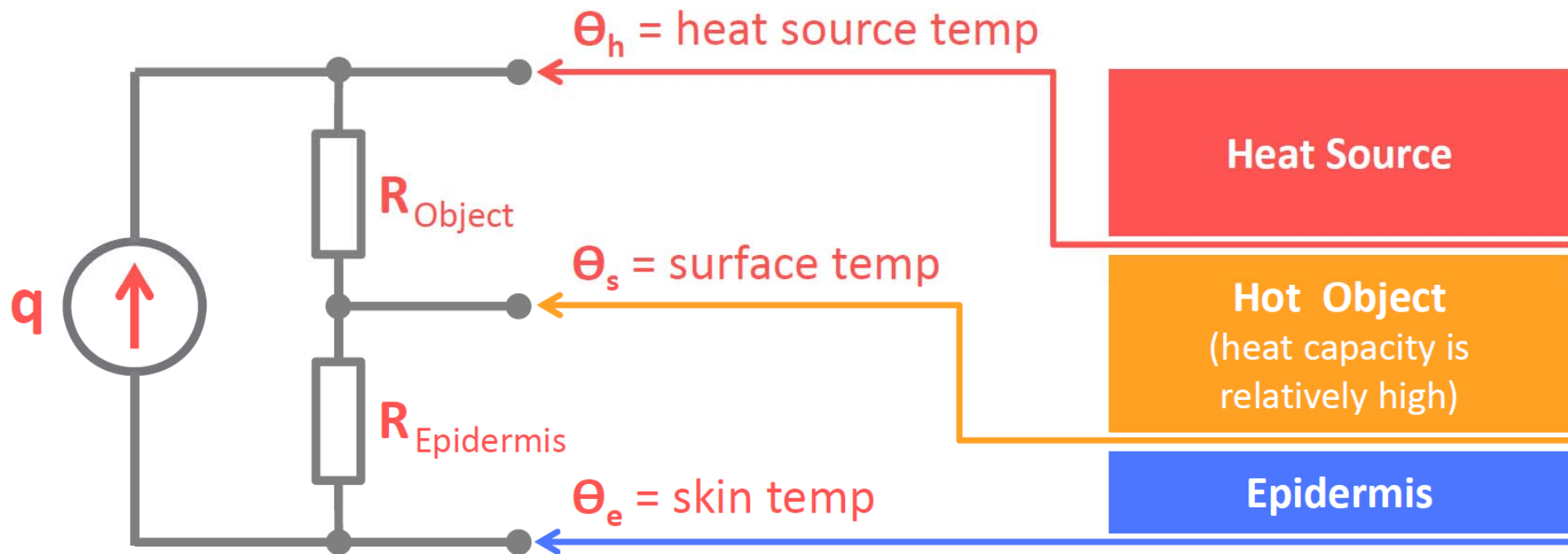
what if $R_{\text{object}} \gg R_{\text{epidermis}}$?

e.g., Polycarbonate (105.26) : skin (6.25) ≈ 16.8



what if $R_{\text{object}} \ll R_{\text{epidermis}}$?

e.g., **skin (6.25)** : **Aluminum (0.02)** ≈ 312.5



scientific background

Moritz and Henriques

- **long contact period** burn thresholds (skin of pigs).

Wu Y.C.

- **formulate calculation of the temperature at skin surface and inside the skin.**

Moritz and Henriques + Wu Y.C.

- **burn thresholds at surface temperature.**

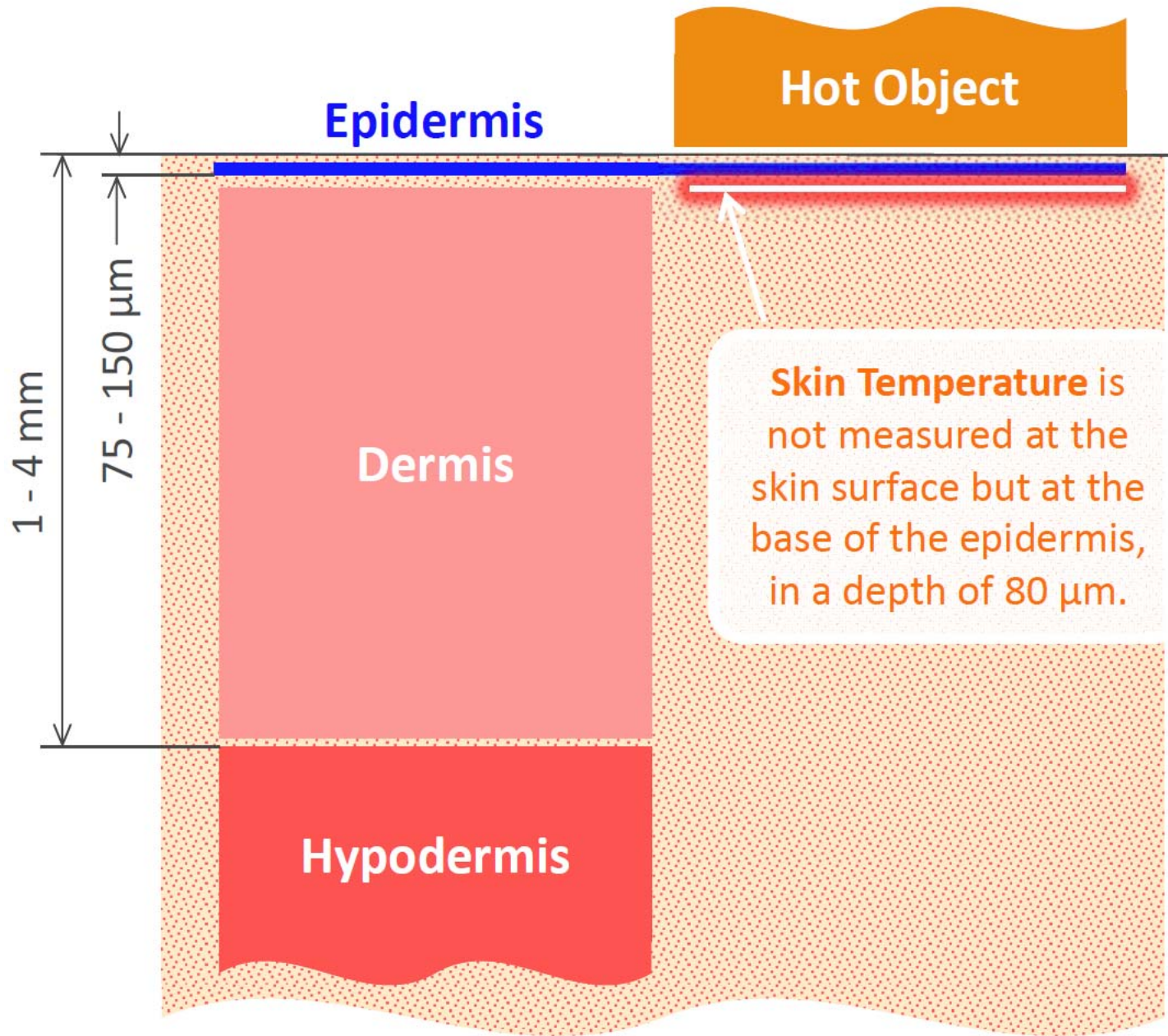
Marzetta

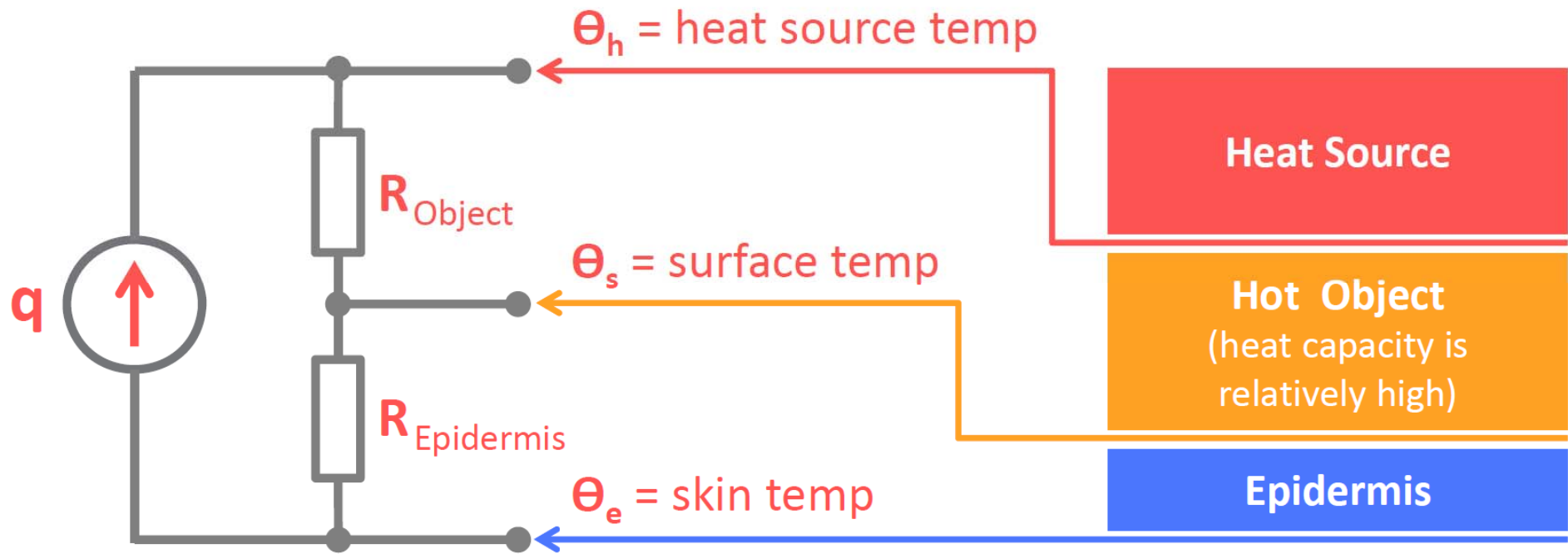
- **constructed “thermesthesiometer”.**

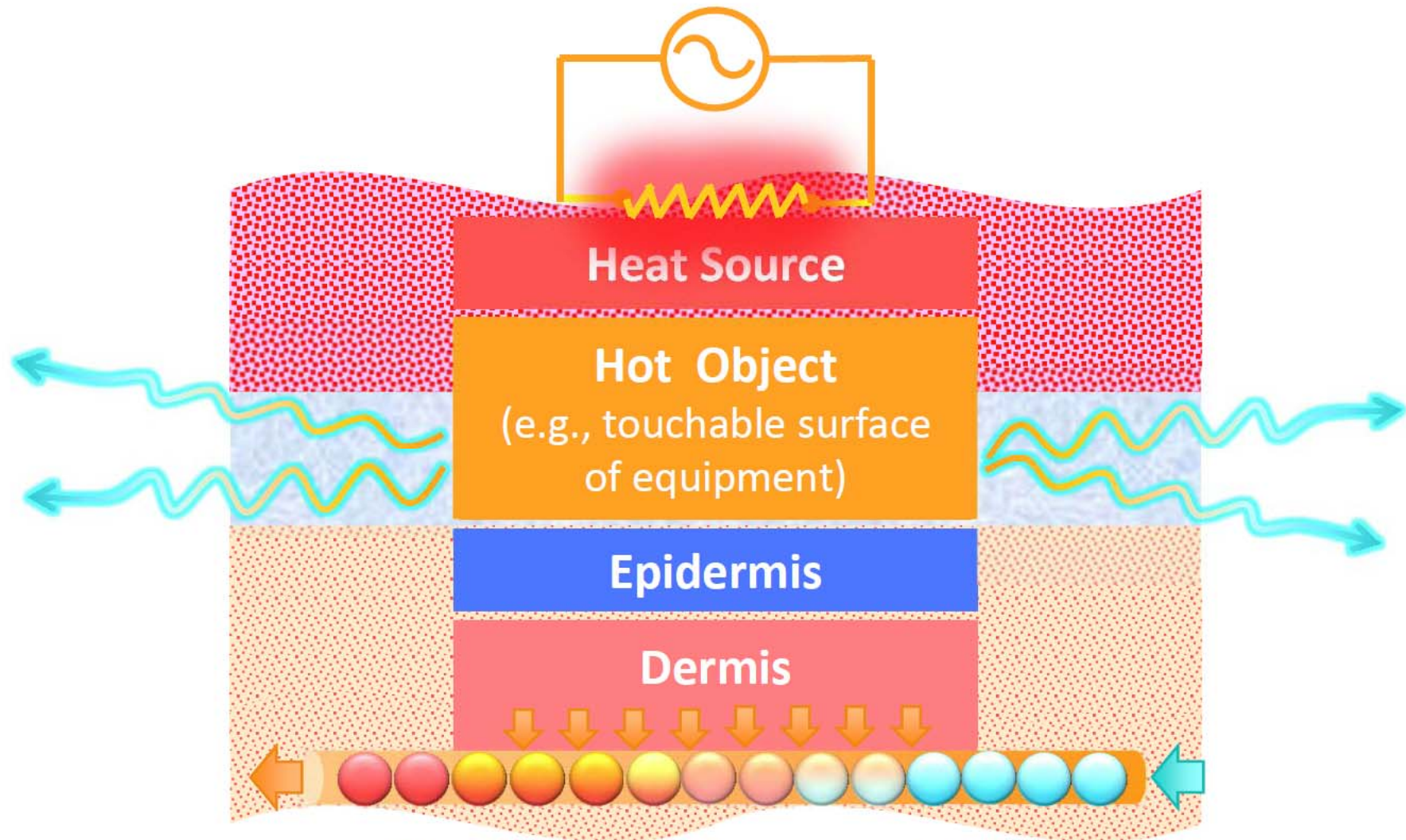
Siekmann

- **established short contact period burn thresholds.**



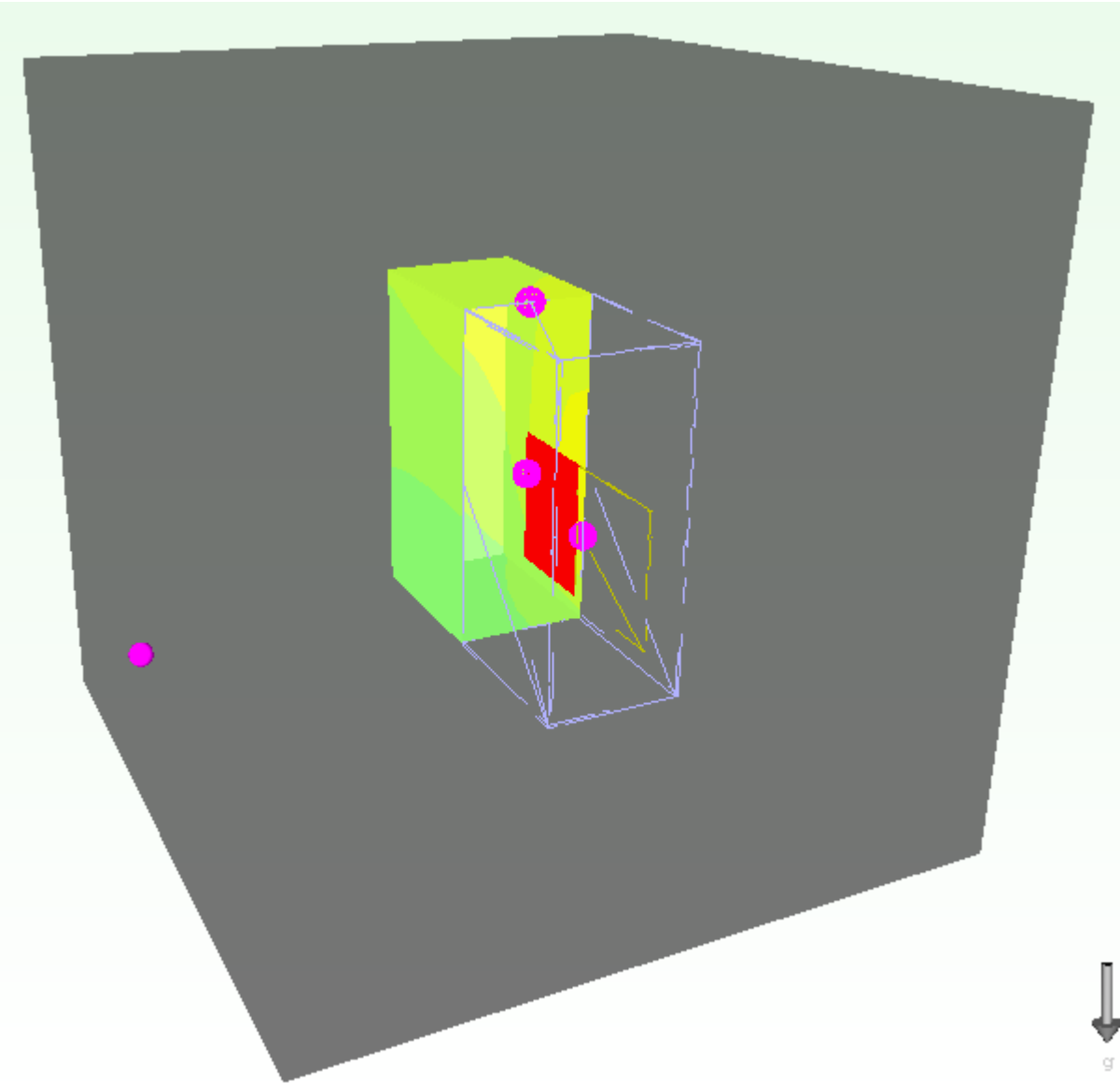




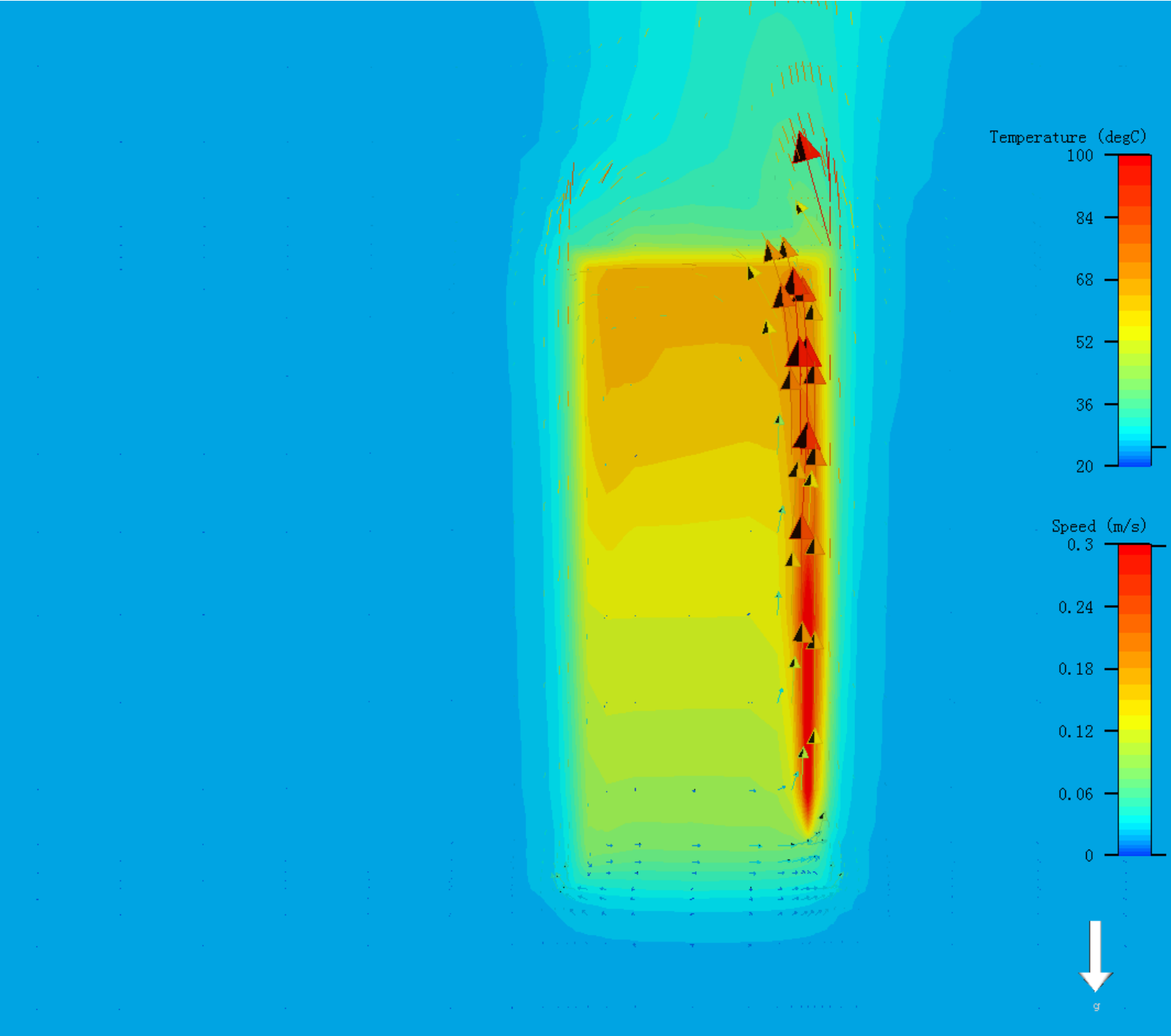


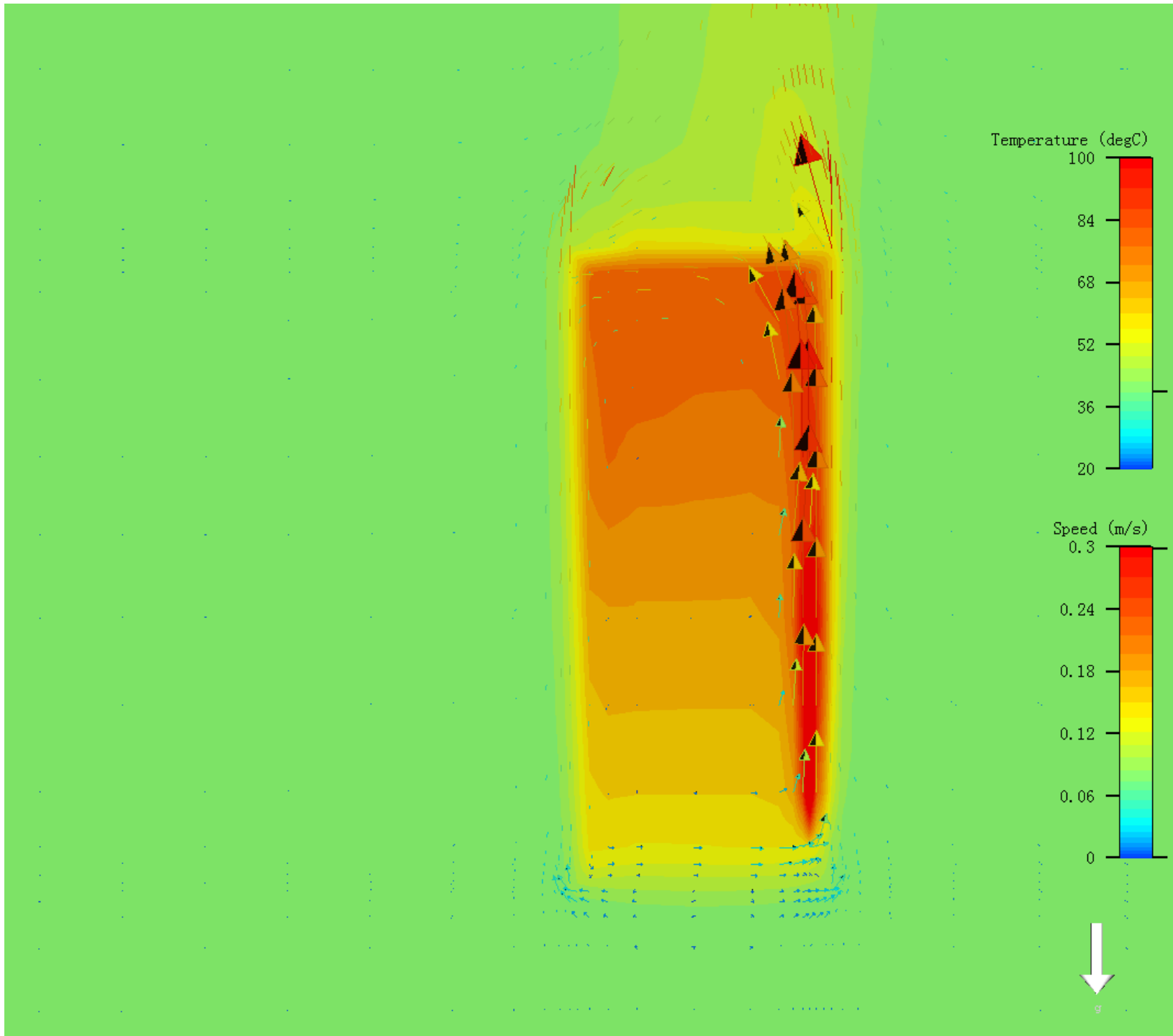
Blood flow and thermoregulation

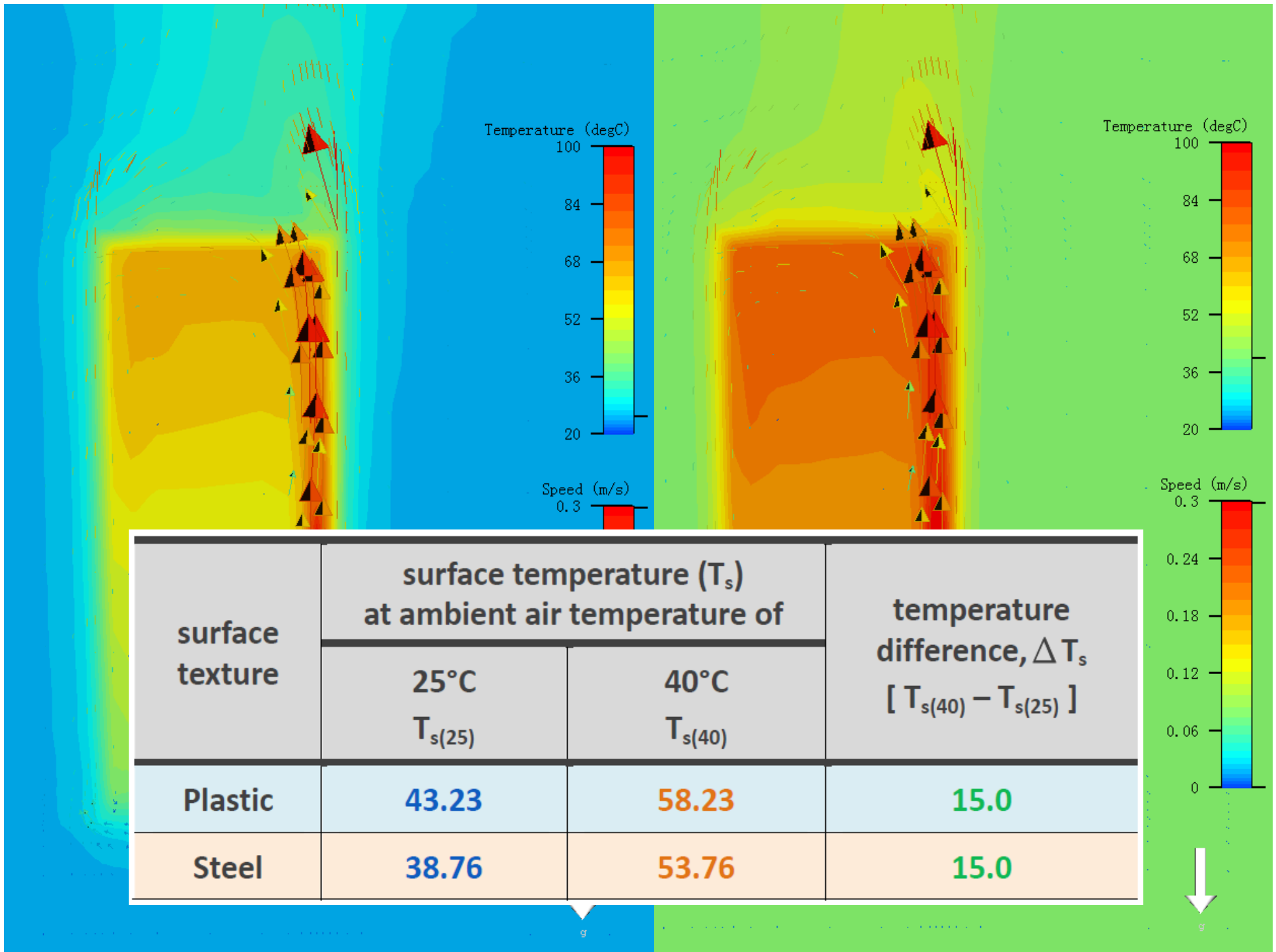




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conclusion

temperature dependency

- human beings are almost temperature independent.
- most machines are temperature dependent/sensitive.

ambient conditions

- higher ambient air temperature is unfavorable to equipment heat dissipation.
- higher ambient is unfavorable to cutaneous burn.
- within the range given by the manufacturer, equipment should operate satisfactorily without compromising its functionality, operability as well as safety.



thank you for your kind attention!



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