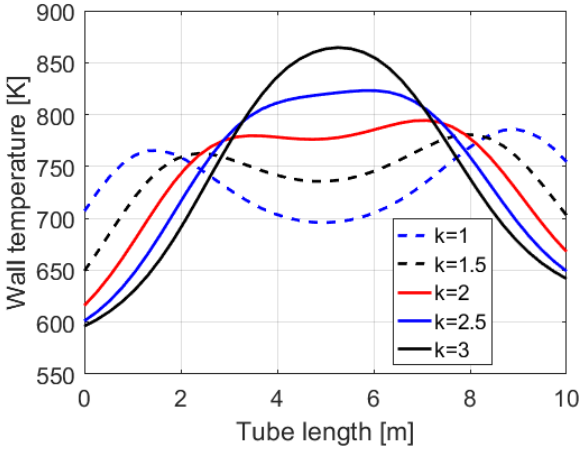
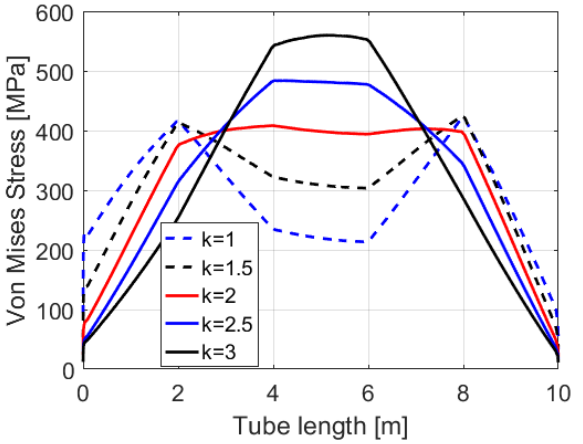


(b)



(c)

Fig. 7. (a) Incident power, (b) wall temperature, (c) and Von Misses stresses along the tube length as a function of the aiming strategy employed.

5. Conclusions

The study of the stresses in the tubes of the solar receivers are crucial to avoid prompt failure of the receivers. The study of these stresses is complex, because they are caused by circumferential, radial and longitudinal temperature gradient, and also by the mechanical boundary conditions.

In this study the stresses in the receiver tubes have been quantified when no movement restrictions are applied (thermal stresses) and when the mechanical boundary conditions are equivalent to the operational conditions (thermal and mechanical stresses). It has seen that the mechanical stresses are an important component of the total stress, increasing the stress value 2 times with respect to the case with not movement restrictions; so its contribution cannot be neglected.

Finally, the total stresses in the receiver tubes have been quantified for different aiming strategies of the heliostats. It has seen that the reduction of the peak flux is not enough to minimise the total stresses in the tubes. The most effective way to reduce the stresses in the tubes is reducing the temperature gradients and homogenising the incident solar flux, which is reached with aiming factors close to 2.

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