

4. Stirling Cryogenerators

Stirling Cryogenerators produce cooling power based on the reversed Stirling Cycle. In short, compression and expansion of a fixed amount of helium creates an efficient heat flow from cryogenic temperatures to ambient.

Stirling Cryogenerators are available in different capacities for different temperatures, for instance:

- 250 W @ 20 K
- 4 kW @ 77 K
- 12 kW @ 200 K

The heat removed from the application is rejected into a cooling water flow. Depending temperature, efficiency ranges from 3 to 15% relative to electric input power.



Figure 4. CryoFans

6. Reduced magnet cool down time

For different customers DH Industries has determined the effect on cool-down time if the above presented system set-up is used. This proves to be quite beneficial.

For a case of a 2500 kg magnet, the cool-down time reduces from the original 5 days to 1.5 days.

Referring to Figure 5, the cool-down time to 80 K is about 20 hours, to 20 K another 13 hours.

7. Conclusion

The cool-down set-up as proposed by DH Industries can drastically reduce the cool-down time. Due to the faster throughput in the factory, this will significantly reduce production cost as this will decrease total production time, reduce inventory while requiring less floor space.

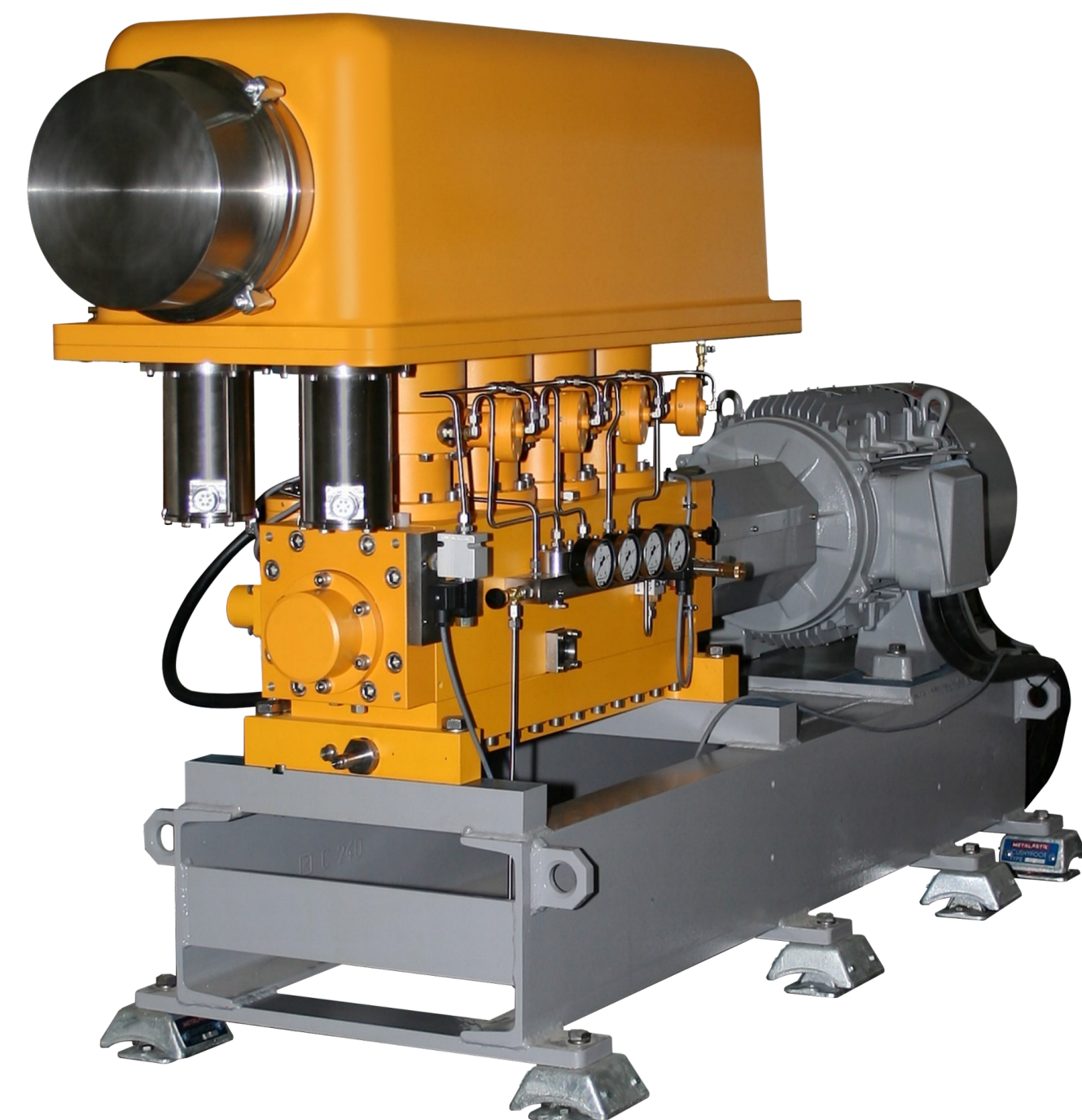


Figure 3. SPC-4T two stage Cryogenerator
250 W cooling power at 20 K

5. CryoZone CryoFans

CryoFans have been specifically developed to efficiently pump around a helium flow at low temperature having minimal heat losses due to static heat in-leak and pump efficiency, thus maximizing available net cooling power.

Various sizes are available to be able to select the size that suits the required point of use of the cooling loop under discussion.

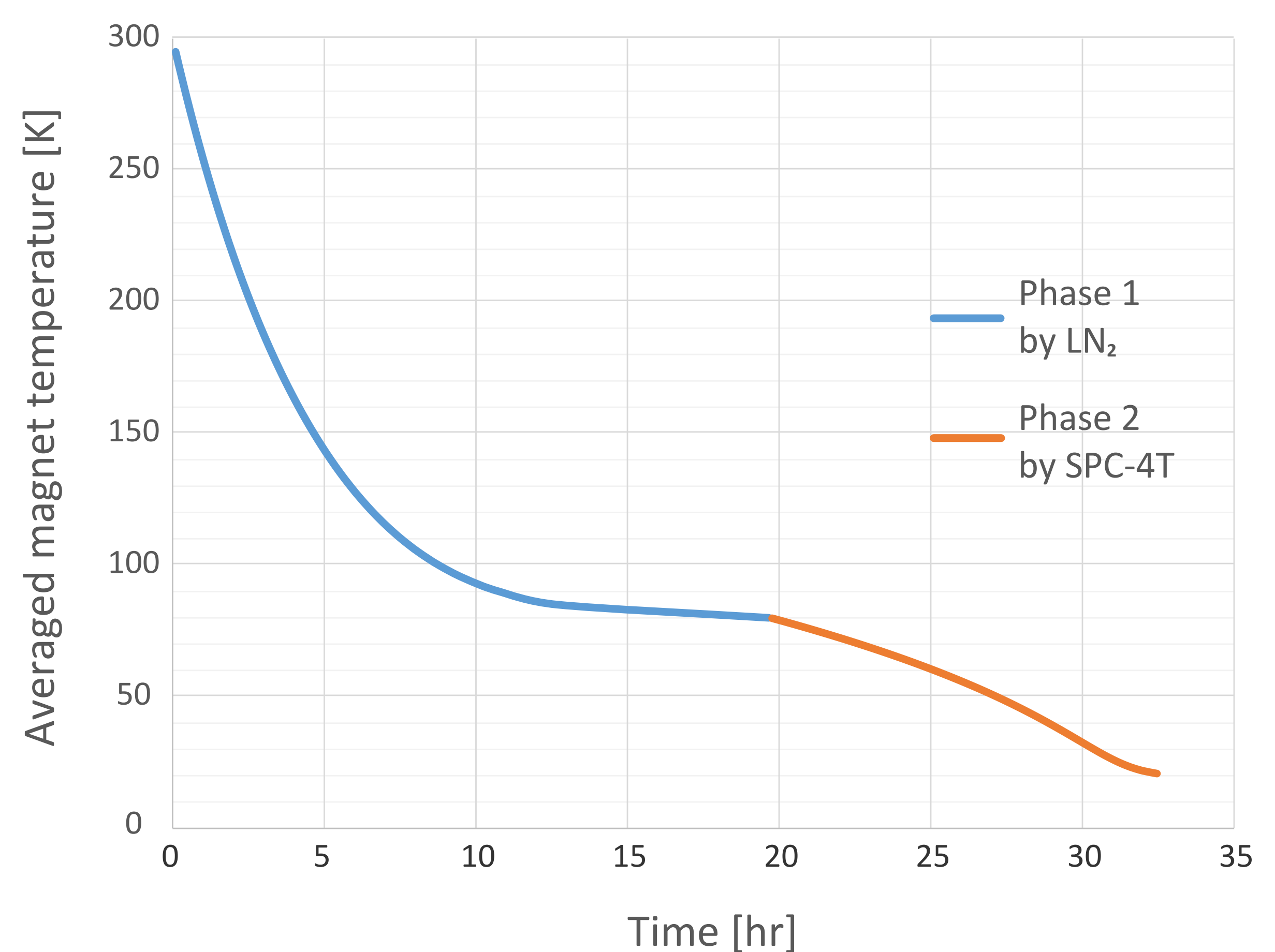


Figure 5. Typical cooling down time of a 2500 kg magnet using the DH Industries cooling concept.