

Comparison of water consumption in indoor swimming pools in the Silesian Voivodeship, Poland: A case study

The provision of sporting amenities, specifically indoor swimming pools, is integral to promoting a healthy lifestyle in today's urban environment. Unsurprisingly, there is a growing demand for such facilities, both within the public and private sectors. However, the development and operation of these establishments place significant strain on municipal water infrastructure, particularly in locales that lack sufficient water distribution systems. Substantial water consumption within indoor swimming pools exacerbates the financial burden on these facilities, affecting their overall profitability and necessitating adjustments to ticket pricing.

METHODOLOGY

A comprehensive comparative analysis was performed on three different indoor pools located in the Silesian Voivodeship in Poland, all adhering to identical design and quality standards. An analysis of water consumption in indoor swimming pools P1, P2, and P3 was conducted using water meters with impulse overlays to continuously capture consumption data. These facilities are equipped with building management systems that facilitate data collection for the presented analyses.

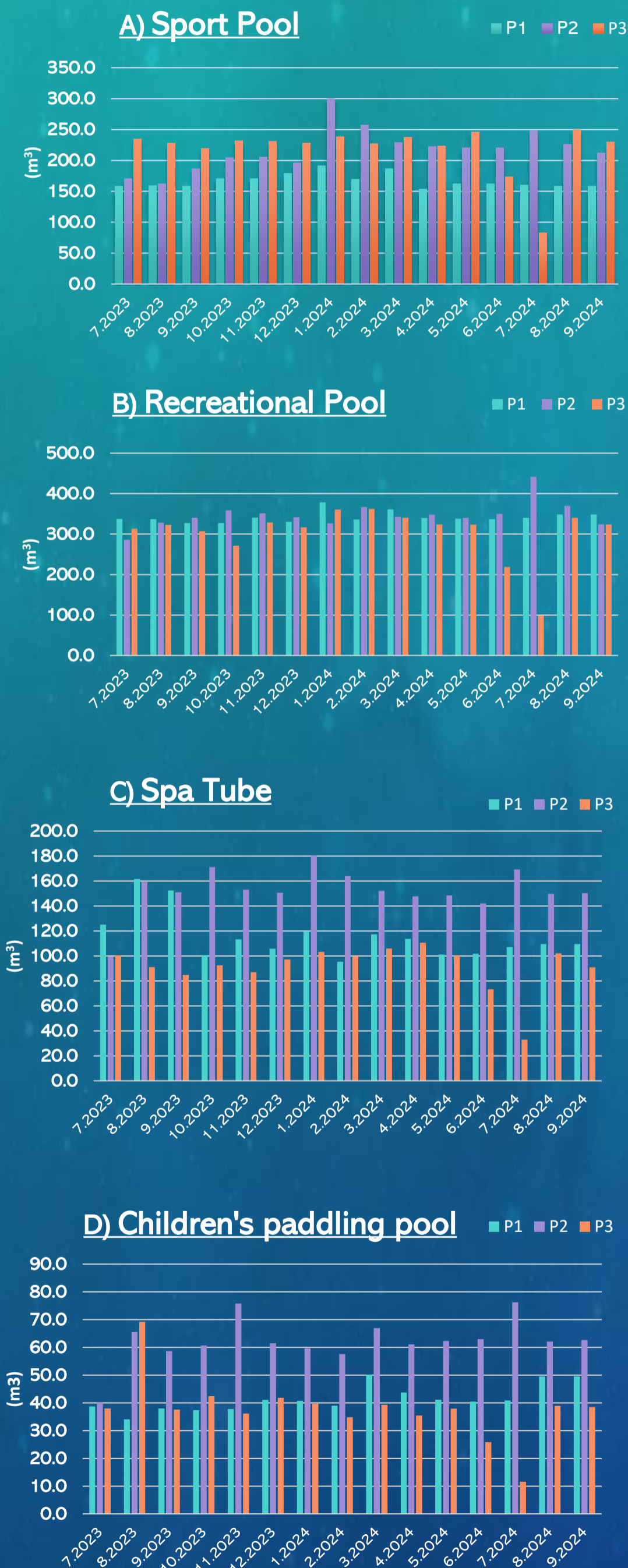


FIG 1. A-D) WATER CONSUMPTION FOR INDIVIDUAL POOLS - P1, P2, P3

	SP	RP	ST	CP
Circulating water flow (m ³ /h)	178	260	72	28
Type of filtration	Vacuum filtration			
Number of filters/ Dimensions (mm)	2 Ø2000 H=2250	3 Ø2000 H=2250	1 Ø1800 H=2250	1 Ø1200 H=2250
Water attractions	NO	YES	YES	YES

SP – Sport Pool
RP – Recreational Pool
ST – Spa Tube
CP – Children's paddling pool

CONCLUSIONS

- Despite similarities in facility equipment, the number of pool basins, water attractions, technology, and frequency of use, there were significant discrepancies in water consumption between individual swimming pools.
- The volume of water replenishment depends on the occupancy of the facility. The process of replenishing pool circuits with tap water, considering the frequency of filter backwash, and evaluating the duration and frequency of individual filtration cycles collectively contribute to upholding the required quality of pool water.
- The increase in the number of pool users is directly correlated with increased water splashing and greater accumulation of dirt in the filters. Consequently, more frequent backwashing becomes necessary, leading to heightened water consumption. In particular, the P2 pool consistently experienced the highest use throughout the year, resulting in the highest substantial water consumption.
- Pool P3 experienced a technological breakdown during the transition between June and July, resulting in a discernible impact on water consumption. The notable surge in water usage in the children's pool in August 2023, in comparison to other observed periods, underscores the imperative to effectuate a water change in the pool on that specific day.