

Sleep monitoring wearables

Empowering health and wellness with advanced sleep tracking



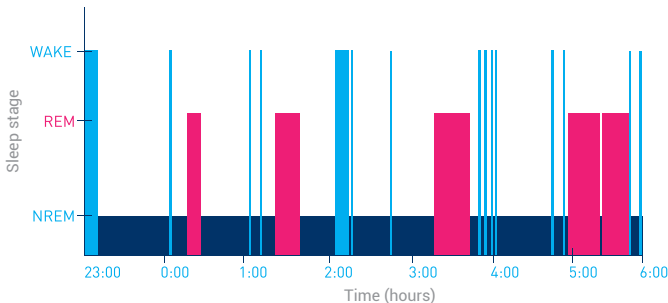
Revolutionizing rest: Sleep monitoring wearables



Optimal sleep revitalizes our bodies. Swiftly identifying and managing sleep disorders like insomnia or sleep apnea is vital for overall health. Wearable technology offers a cost-effective way for the early detection and long-term monitoring of sleep and associated disorders.

Utilizing unobtrusive optical sensors in wearables, CSEM's approach continuously captures vital parameters such as pulse rate, breathing rate, SpO₂, and blood pressure during sleep. Our algorithms analyze these datum to discern sleep stages and other metrics. This holistic approach presents a more complete picture of sleep quality in a user-friendly manner.

Sleep profile



Sleep latency	25 min	Mean breathing rate	12 bpm
Total sleep time	6 hr 10 min	Mean pulse rate	63 bpm
Time in bed	7 hr	Mean SpO ₂	97%

Unparalleled Advantages

- Unobtrusive solution, suitable for long-term monitoring (over several nights)
- Low-power sleep tracking algorithms validated in clinical sleep studies
- Wide range of expertise from optical sensor design to algorithm development and clinical validation

Parameter	Description	Watch ¹	Fingertip ¹	Thorax ¹
Breathing rate	Number of breaths per minute	9	8	9
Drowsiness	Indicator of sleepiness or lethargy	5	5	5
Optical blood pressure	Trends of systolic, mean, and diastolic blood pressure (occlusion-free)	9	9	7
Pulse rate	Number of pulses per minute	9	8	9
Sleep latency	Duration of time from bedtime to the onset of sleep	6	6	6
Sleep quality	Sleep duration, sleep fragmentation, sleep cycles	6	6	6
Sleep stage	Classification of sleep (HRV-based) among [WAKE, REM, NREM]	9	9	9
SpO ₂	Arterial oxygen saturation measured with a pulse oximeter	7	7	7
Time in bed	Time from "lights off" to "lights on"	6	6	6
Total sleep time	Total of all REM and NREM sleep in a sleep episode, e.g., during the time from "lights off" to "lights on"	9	9	9

¹Numbers in the table indicate the Technology Readiness Level (TRL) according to ISO 16290:2013

Contact us now

[csem.ch](https://www.csem.ch)

