

<b>STN</b>	<b>Nositeľné elektronické zariadenia a technológie</b> <b>Časť 402-3: Meranie výkonnosti nositeľných</b> <b>zariadení používaných pri posilňovaní</b> <b>a udržiavaní telesnej kondície</b> <b>Skúšobné metódy na stanovenie presnosti</b> <b>merania srdcovej frekvencie</b>	<b>STN</b> <b>EN IEC</b> <b>63203-402-3</b>  35 9350
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Wearable electronic devices and technologies - Part 402-3: Performance measurement of fitness wearables - Test methods for the determination of the accuracy of heart rate

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

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EUROPEAN STANDARD

**EN IEC 63203-402-3**

NORME EUROPÉENNE

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February 2024

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**Wearable electronic devices and technologies - Part 402-3:  
Performance measurement of fitness wearables - Test methods  
for the determination of the accuracy of heart rate  
(IEC 63203-402-3:2024)**

Technologies et dispositifs électroniques prêts-à-porter -  
Partie 402-3: Mesurage de l'aptitude à la fonction des  
dispositifs prêts-à-porter pour les activités de mise en forme  
- Méthodes d'essai pour déterminer l'exactitude des  
mesures de la fréquence cardiaque  
(IEC 63203-402-3:2024)

Tragbare elektronische Geräte und Technologien - Teil 402-  
3: Leistungsmessverfahren für Fitness-Wearables -  
Testmethoden für die Bestimmung der Genauigkeit der  
Herzfrequenz  
(IEC 63203-402-3:2024)

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## NORME INTERNATIONALE



**Wearable electronic devices and technologies –  
Part 402-3: Performance measurement of fitness wearables – Test methods for  
the determination of the accuracy of heart rate**

**Technologies et dispositifs électroniques prêts-à-porter –  
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pour les activités de mise en forme – Méthodes d'essai pour déterminer  
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**WEARABLE ELECTRONIC DEVICES AND TECHNOLOGIES –****Part 402-3: Performance measurement of fitness wearables –  
Test methods for the determination of the accuracy of heart rate**

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The text of this International Standard is based on the following documents:

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124/247/FDIS	124/259/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.



This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

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## INTRODUCTION

The intent of this document is to evaluate the accuracy of wearables that measure heart rate with a photoplethysmogram (PPG) sensor.

Heart rate is a widely used physiological variable that non-invasively assesses the cardiac autonomic nervous system by measuring changes in the cardiac rhythm through time. Heart rate can be measured from an electrocardiographic signal (ECG). However, the use of physiological signals other than ECG to extract heart rate information is common. The term “pulse rate” has been used in literature to reference heart rate obtained through PPG.

Researchers have been using PPG to extract as much information as possible given its widespread use in clinical and everyday activities. PPG is a simple, non-invasive, optical measurement technique used for the detection of blood volume changes in peripheral tissue. Pulse rate has been treated as a synonym to heart rate and these two terms are often used interchangeably by manufacturers in describing device features to consumers. However, it is possible that the relationship or differences between heart rate and pulse rate will not be clear based on intent. Because some countries and manufacturers can use the term pulse rate rather than heart rate, the reader is encouraged to clarify preferential term, if the term is being used as a synonym, and testing expectations.

Heart rate measures the rate of contractions or heartbeats whereas pulse rate measures changes in blood pressure. For an unhealthy person, these two factors could be different. The reader is reminded that according to 4.4.1 of this document, test participants are asked to fill out the Physical Activity Readiness Questionnaire (PAR-Q) to determine their eligibility for the comparative test. Anyone deemed unhealthy per the PAR-Q will be disqualified from testing.

## **WEARABLE ELECTRONIC DEVICES AND TECHNOLOGIES –**

### **Part 402-3: Performance measurement of fitness wearables – Test methods for the determination of the accuracy of heart rate**

#### **1 Scope**

This part of IEC 63203 specifies terms, a measurement protocol, and a test to evaluate the accuracy of wearables that measure heart rate with a photoplethysmogram (PPG) sensor. While this document can be used to measure a variety of different devices claiming to report heart rate, care will be taken when testing in countries that differentiate between heart rate and pulse rate. This measurement protocol is not intended to evaluate medical devices associated with the IEC 60601 series or ISO 80601 series.

#### **2 Normative references**

There are no normative references in this document.

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