

# dXXXXr0 - Towards std::units

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Project:	Programming Language C++
Audience:	LWG/LEWG
Target:	C++20

## 1 Motivation

## 2 Acknowledgements

- All people who inspired me to work on this, because they created and used units libraries.
- C++now 2017 participants who worked on this during the "library in a week" workshop: Billy Baker, Charles Wilson, Daniel Pfeifer, Dave Jenkins, Manuel Bergler, Morris Hafner, Nicolas Holthaus, Peter Bindels, Steven Watanabe, Tuan Tran.

## 3 Components and Relationships

**Dimension** 7 physical base dimensions (length, mass, time, current, temperature, amount of substance, luminous intensity), combined, user-defined, special dimensionless (e.g., angles)

**Unit** unit of measurement for a given dimension (m,kg,s,A,K,mol,cd) , can be scaled (kilo, micro),

**Quantity** a measurement in a given unit, convertible to other quantity of same dimension, that is what one computes with, must be as efficient as the underlying numerical type

**Units System** A set of dimensions and units useful for a domain, e.g., SI units. Combines UDL-suffixes for the units, formatting/IO for quantities, conversions

**Conversion** A rule/computation to convert a quantity in one unit into a corresponding quantity of the same dimension in another unit, potentially from another unit system.

### 3.1 Dimensions and Dimensional Analysis

#### 3.1.1 Operational Combinations

### 3.2 Units

### 3.3 Quantities

### 3.4 Units Systems

### 3.5 Math functions for quantities

## 4 Specification

#### 4.0.1 Bla

[bla]

bla

<sup>1</sup>      *Requires:* bla

<sup>2</sup>      *Effects:* bla