

# Band Design Guidelines for Apple Watch

Release R3

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# 1. Introduction

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**Note:** These Band Design Guidelines for Apple Watch (including without limitation any and all specifications relating to Apple Watch lugs) ('Guidelines') are subject to the terms and conditions set forth on the final page of this document. By downloading, accessing, or otherwise utilizing these Guidelines, you agree to be bound by, and only utilize the Guidelines in accordance with, such terms and conditions.

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## 1.1 Purpose of This Specification

This document presents design guidelines for band accessories that are compatible with Apple Watch.

## 1.2 Requirements and Recommendations

The use of the words *must*, *must not*, *required*, *shall*, *shall not*, *should*, *should not*, *recommended*, *not recommended*, *may*, *optional*, and *deprecated* in a statement have the following meanings:

- *must*, *shall*, or *required* means the statement is an absolute requirement.
- *must not*, *shall not* or *prohibited* means the statement is an absolute prohibition.
- *should* or *recommended* means the full implications must be understood before choosing a different course.
- *should not* or *not recommended* means the full implications must be understood before choosing this course.
- *may* or *optional* means the statement is truly optional, and its presence or absence cannot be assumed.
- *deprecated* means the statement is provided for historical purposes only and is equivalent to 'must not'.

## 2. Watch Bands

A well-designed band will securely attach to Apple Watch while not interfering with its operation. See [Device Dimensional Drawings](#) (page 11) for Apple Watch dimensional drawings with defined keepout zones.

### 2.1 Requirements

Bands for Apple Watch must integrate two lugs that mate with the Apple Watch Band Interface (see [Apple Watch Band Interface](#) (page 7)). Apple Watch uses a high precision interface profile; see <https://developer.apple.com/watch/bands/> for a sample 2D lug profile. Lugs should lock into the band mating slot with a 'lug latch' feature that prevents accidental removal of the band.

Exposed edges of bands and lugs must pass UL 1439 tests for sharpness of edges on equipment and BS EN71-1:2014, *Safety of Toys - Mechanical and physical properties*.

The lug latch must never become jammed in the extended position.

Bands must not integrate magnetic chargers.

Bands and lugs should:

- Pass a 72 hour salt mist test as specified in ASTM B117 with no visible corrosion.
- Resist a 5-20 kgf lateral slide-out force when installed in Apple Watch.
- Resist a 20 kgf or greater pull force as specified in ISO-6245:1996, *Specifications for Diver's Watches*, section 7.3.
- Detach easily from Apple Watch when the band release buttons are pressed.
- Take into account the weight of Apple Watch.

For compatibility with Apple Watch heart rate sensors, bands should:

- have length sizing adjustment pitch of less than 7 mm (center to center)
- provide sufficient adjustability for the user to achieve a snug, yet comfortable, fit that prevents movement of Apple Watch relative to skin

Bands must not prevent the user's skin from maintaining direct contact with the Apple Watch heart rate sensors and back of Apple Watch, and must incorporate sufficient margin to compensate for shifting or dimensional changes of the band material. Failure to do so may interfere with Apple Watch wrist detect and Apple Pay features.

Bands intended for use during exercise should maintain a snug fit through a full range of motion to maintain compatibility with Apple Watch heart rate sensors.

Apple recommends the following materials for lug bodies:

- silicone, hardness: 75 shore A
- 50-55% glass filled nylon
- stainless steel 316L (EN 1.4435), hardness: 240-270HV

Apple recommends the following materials for lug latches:

- 50-55% glass filled nylon
- stainless steel 316L (EN 1.4435), hardness: 240-270HV

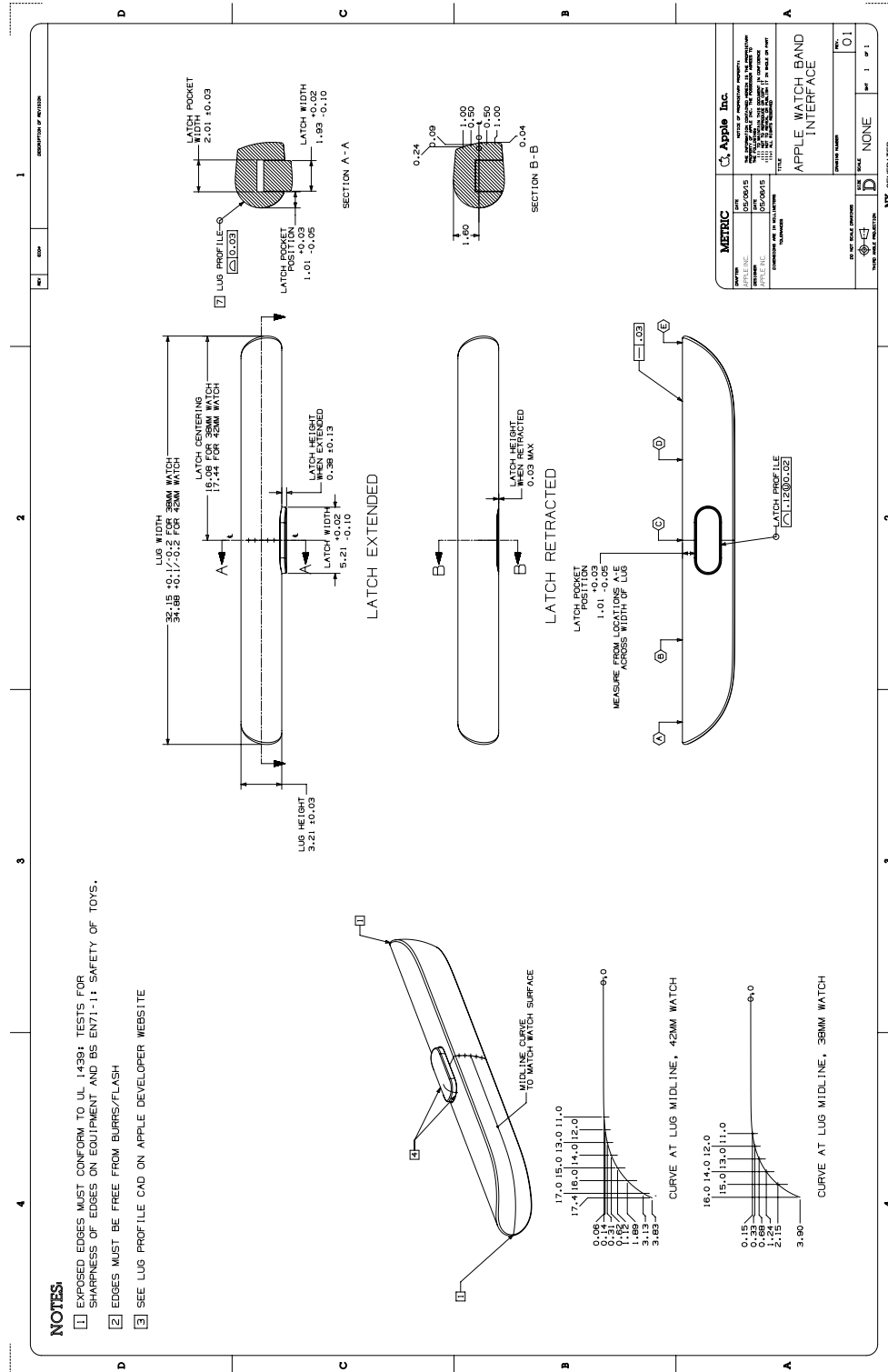
Bands for Apple Watch must comply with applicable environmental regulations in the regions in which such bands are to be sold, and any applicable substance or material restrictions, including applicable restrictions on the following substances:

- organic tin compounds, PFOS, PFOA, phthalates, azo dyes, and PAHs, per requirements of the EU REACH regulation EC 1907/2006
- nickel leach rate on surfaces in prolonged skin contact, per requirements of the EU REACH regulation EC 1907/2006
- cadmium, lead, hexavalent chromium, and nickel, per requirements of EU Directive 2009/48/EC
- natural rubber latex, per requirements of EU Directive EC 93/42/EEC
- dimethylfumarate (DMFu), per requirements of EU Regulation 412/2012
- pH and Formaldehyde, per requirements of China GB 18401 for textiles and China GB 20400 for leather
- endangered species of flora and fauna in products or packaging (US Lacey Act)

Apple Watch Lug components will be made available through an authorized distributor for integration into third party bands. See [Apple Watch Lug](#) (page 8) for a dimensional drawing. Details will be posted at <https://developer.apple.com/watch/bands/>.

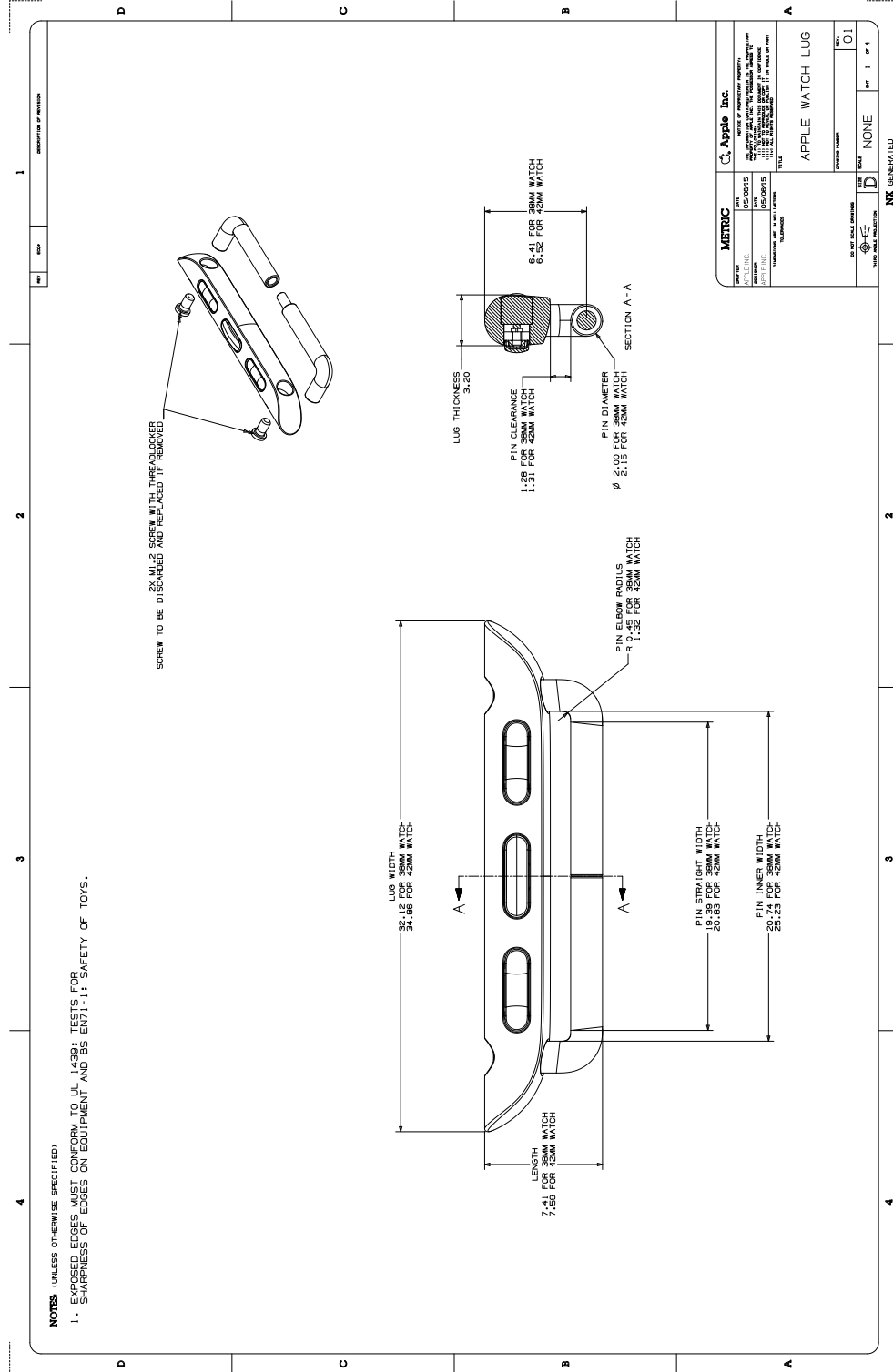
## 2.2 Apple Watch Band Interface

Figure 2-1 Apple Watch Band Interface



## 2.3 Apple Watch Lug

Figure 2-2 Apple Watch Lug



## 2.4 Apple Watch Lug Assembly

### 2.4.1 Required Equipment

- Lugs
- Screws (included with lugs)
- Pentalobe 1.1 screwdriver (bit model no. 05300018002 or 05300018001 (250 units)) from Wera Tools

### 2.4.2 Recommended Equipment

- Assembly fixture with clamping device
- Loctite 435 for screw threads

Proper assembly of the lug is critical to ensure the band securely attaches to the Apple Watch. Improper assembly may result in damage to the Apple Watch and/or the band.

Screws that have been previously installed/used must not be reused.

The assembly fixture should hold the lug assembly in place and a clamping device should compress the lug during screw insertion.

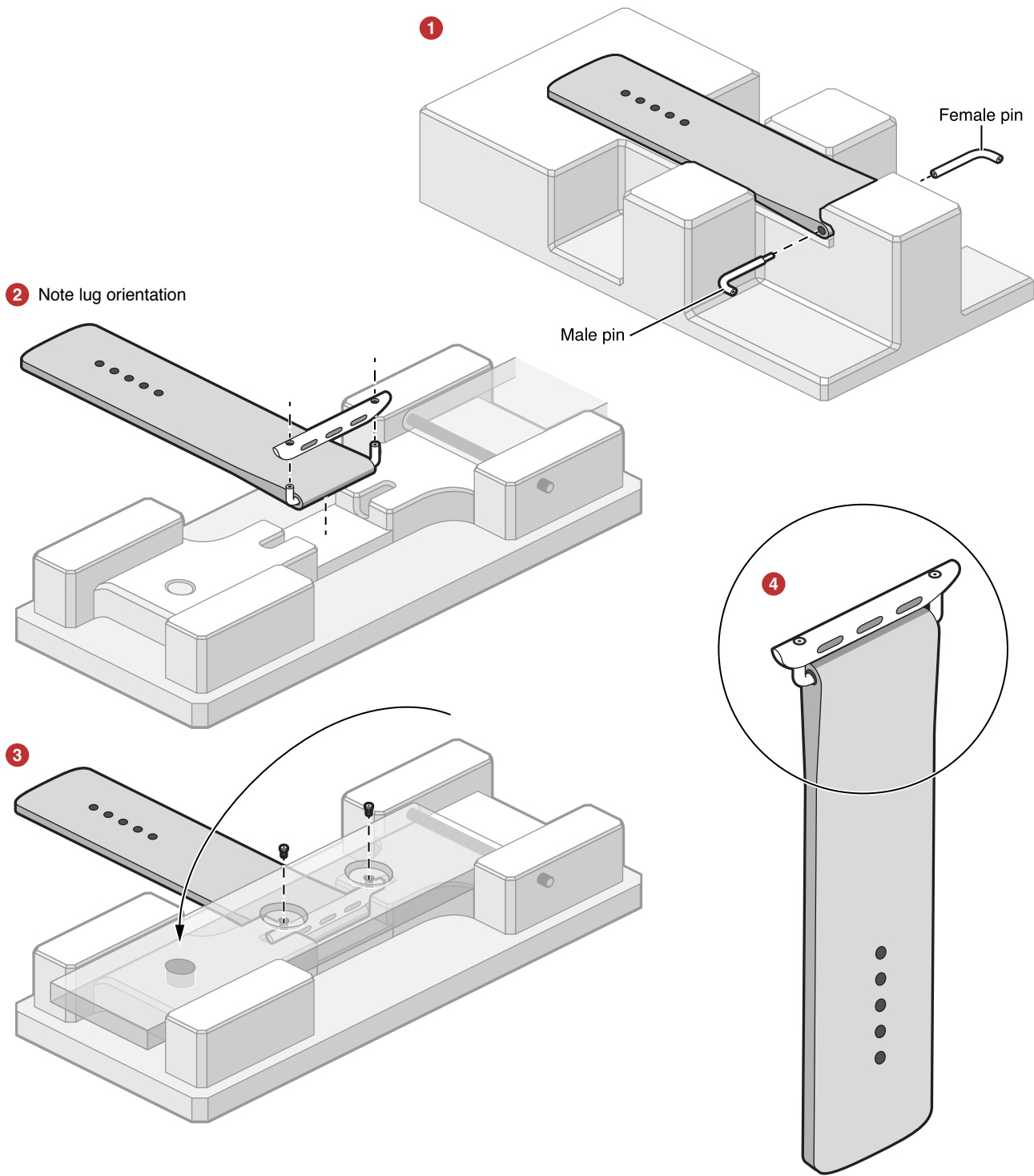
### 2.4.3 Assembly Instructions

See [Figure 2-3](#) (page 10) for detailed drawing of assembly instructions.

1. Lightly insert the long end of the female pin in the band until hard stop. Ensure there is no warping or damage in the band.
2. Lightly insert the long end of the male pin in the other side of the band until it interlocks with the female pin and both pins are seated together. Ensure there is no warping or damage in the band.
3. Align the holes on the bottom of the lug with the exposed ends of the female and male pins. Note lug latch top/bottom orientation relative to band. Latch must be on the side of the band against the wrist.
4. Apply Loctite 435 to screw threads.
5. Install both screws at the top of the lug as seen in [Figure 2-3](#) (page 10) using the following specification:
  - Torque: 1.1 kgf-cm +/- 10%
  - RPM: 120 +/- 10%
6. Inspect for screw proudness and cross-threading visually at 1200-1400 lux
7. Ensure screw is just sub-flush to the lowest part of the counterbore and appears parallel to the long axis of the lug.

8. Ensure screw is flat and concentric with the counterbore, without damage to the Pentalobe pattern.

Figure 2-3 Apple Watch Lug Assembly Fixture



# 3. Device Dimensional Drawings

This chapter contains the following dimensional drawings:

- [Apple Watch 38 mm](#) (page 12)
- [Apple Watch 42 mm](#) (page 13)





## 4. Revision History

This table describes the changes to the Band Design Guidelines for Apple Watch.

Date	Notes
2015-12-18	<i>Release R3</i>
	Added <a href="#">Apple Watch Lug Assembly</a> (page 9)
2015-05-06	<i>Release R2</i>
	Updated Dimensional Drawings
2015-04-24	<i>Release R1</i>
	First Release of "Band Design Guidelines for Apple Watch"

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