







# Stainless Steel Pin with Mast Overview

## Stainless Steel Pin with Mast

<a href="#">Back to comparison table</a>	Mount Commonly Used	Stabi lity	Cost	Install Time	Labor	Substrate	
	 Cup with brass adapter	 med- high	 \$265-3 50	 1 hr	 1	BR, R	

Stainless steel mast designs may vary. In general, they consist of a threaded pin set into bedrock with cement or epoxy, with a threaded mast screwed onto the pin. Throughout the semi-permanent GNSS network in Afar, Ethiopia (E. Calais, Purdue University), pins are ten inches long and masts are 1"-diameter and 0.5m (19.7") long (shown below). The pin is installed as close to vertical as possible; a stainless steel cup with a threaded brass adapter is used for the antenna mount. The cup does not allow for precise leveling but does allow for the antenna to be oriented to north. A dimple on the pin allows the pin to be used as a survey marker should the mast be removed.



Site DASL of the ASH network, Ethiopia

## Pros

- Inexpensive (e.g. ~\$110-200 for the pin and mast, \$150 for the mount)
- Can be installed with a battery-powered drill
- Small footprint, low-profile
- Short installation time (<1 hr)
- Can be installed on a rooftop or other stone or cement structure
- more stable than the all-thread mast

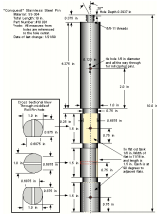
## Cons

- Can only be installed in solid material

## Design and Construction

A battery-powered drill is all that is needed for installation of the pin.

## Documents



### [Threaded monument pin \(Conquest pin\) machining instructions \(cost \\$100\)](#)

Please note: Alternatively, a 8" long SS 5/8" all-tread rod with a SS nut epoxied or welded on to the rod can be substituted for the pin mentioned above.

Similar to the all tread mast but installed flush to the ground. See the [article](#) on the all tread rod mast.

## Installation Photos



Feleke Worku of the Ethiopian Mapping Agency uses a battery-powered Hilti hammer drill to drill the hole for a monument pin in the Afar network.

## Approximate Cost

\$165-250

*This cost is for the monumentation only; the antenna mount is not included.*

## Materials

- pin

- mast
- epoxy or quick-setting, expansive concrete
- Loctite or other glue for threads (optional)

## Tools

- battery-powered drill
- tube to blow rock flour out of the hole
- level
- adjustable wrenches, vice grips, or pipe wrenches for tightening threads (recommended)
- compass

## Mount Commonly Used



A 5/8" threaded leveling mount (cost \$150) can be used, but we commonly use a simple non-leveling mount consisting of a stainless steel cup holding a brass adapter. The antenna is screwed onto the brass adapter and can be rotated to north. The adapter is then held in place in the cup with a set screw. The monument itself is installed as close to vertical as possible.

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