

High Speed Bicycle

CSK BACKSTOPPING CLUTCH

PROBLEM

Every year, engineering teams from around the world come to compete at the World Human-Powered Speed Challenge held in Battle Mountain, Nevada. The current speed record stands at 133 Km/h (83 mph). Team AeroVelo, comprised of professionals and engineering students from the University of Toronto, brought "Eta", their newly designed, high-speed aerodynamic bicycle or "Speed Bike" to the 2014 competition.

Most bicycles have a freewheel which allows the wheel to rotate even when the pedals and chain are stationary. However, Eta's front-wheel-drive design could not utilize an off-the-shelf bicycle freewheel. Instead, an overrunning clutch solution was required.

SOLUTION

After careful research, the team contacted Formsprag in Warren, Michigan to request a Stieber Model CSK25 PP overrunning clutch, which was donated as part of Formsprag's Student Support Program. While other clutches were considered, given the size and loads involved, the CSK was the clear choice. The clutch was press fit onto the front wheel hub body, and pressed inside of the sprocket. It is responsible for driving the wheels up to 145 Km/h (90 mph).

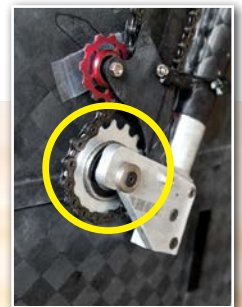
CSK units feature ultra-hard Formchrome® sprags which provide extra-long life, maximum wear resistance and lower maintenance costs. Formchrome sprags – exclusive with Stieber/Formsprag – are made by diffusing chromium into the surface of hardened high carbon alloy steel to form a chromium-carbide alloy.

With the help of the Stieber clutch, Team AeroVelo's Eta speed bike achieved a top speed of 126 Km/h (78 mph) at the 2014 World Human-Powered Speed Challenge.



HIGHLIGHTS

- 77.5 lb.ft. (105 Nm) torque capacity
- Sprag type backstopping clutch
- Keyway on both the inner and outer race
- 5,000 RPM maximum overrunning speed
- Formchrome® sprags for long life



Regal Rexnord

regalrexnord.com

stieberclutch.com

Europe - Germany

Hatschekstraße 36
69126 Heidelberg, Germany
+49 (0) 6221-3047

Dieselstraße 14

85748 Garching, Germany
+49 (0) 8932-9010

North America - USA

23601 Hoover Road
Warren, MI 48089, USA
586-758-5000

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