Technical Bulletin

SYNCHRONOUS BELT RATINGS

Not all synchronous (timing) belts are created equally. Synchronous belts have evolved a great deal since Gates first developed the PowerGrip® classical pitch belt in 1940. Gates designed the PowerGrip® HTD belt in 1970, and then the PowerGrip® GT® (Gates Tooth) belt in 1990. These were all rubber belts with glass fibre tensile cords. In 1980 we developed the first version of our Poly Chain® GT® belts. These belts were made of polyurethane and had Aramid (Kevlar) tensile cords. The latest evolution of this belt is our Poly Chain® GT® Carbon™ with carbon fibre tensile cords.

Each new belt construction brought with it a higher power rating over the previous one, so as you can expect our newest design belts have far superior capability to the original design. This means you can reduce the size and weight of your drives and reap the efficiency gains from the newer technology belts. Gates have over 70 years of belt research and design knowledge and expertise to bring you the best products and solutions.

Classical profile belts are not used for the design of most new medium to large sized industrial belt drives any more. HTD (curvilinear) has been one of the most common profiles used in the past and is still used heavily today. The newest style belts utilise a modified curvilinear tooth profile for optimum accuracy and power transmission.

PowerGrip® HTD
[Curvilinear - Round]

PowerGrip® GT3
[Modified Curvilinear]

Poly Chain® GT® Carbon™
[Modified Curvilinear]

To highlight what is possible today, here is an example of a fan drive and the options available for each of these belt constructions. The Rated Load needs to be at least as high as the Design Power.

> **INPUT =** 30kW @ 1440 rpm
> **DRIVEN UNIT =** ACHE Fan running at 720 rpm +/- 5%
> **CENTRE DISTANCE =** 700mm +/- 5%
> **SERVICE =** 16 hours/day
> **SERVICE FACTOR =** 1.8
> **DESIGN POWER = 54 kW**

Drive Details	PowerGrip® HTD	PowerGrip® GT3	Poly Chain® GT® Carbon™
Pitch (mm)	14	14	14
Sprockets (teeth)	32 - 64	32 - 64	32 - 64
DriveN Speed (rpm)	720	720	720
Belt Width (mm)	**115**	**55**	**20**
Rated Load (kW) TOTAL	62	64.3	55.2
Rated Load (kW) PER MM	0.54	1.17	2.76
CD (mm)	710	710	710
BELT	**2100-14M-115**	**2100-14MGT-55**	**14MGT-2100-20**
Total Weight (kg)*	**35.4**	**24.8**	**13.7**

*- *Total weight doesn't include bushes*

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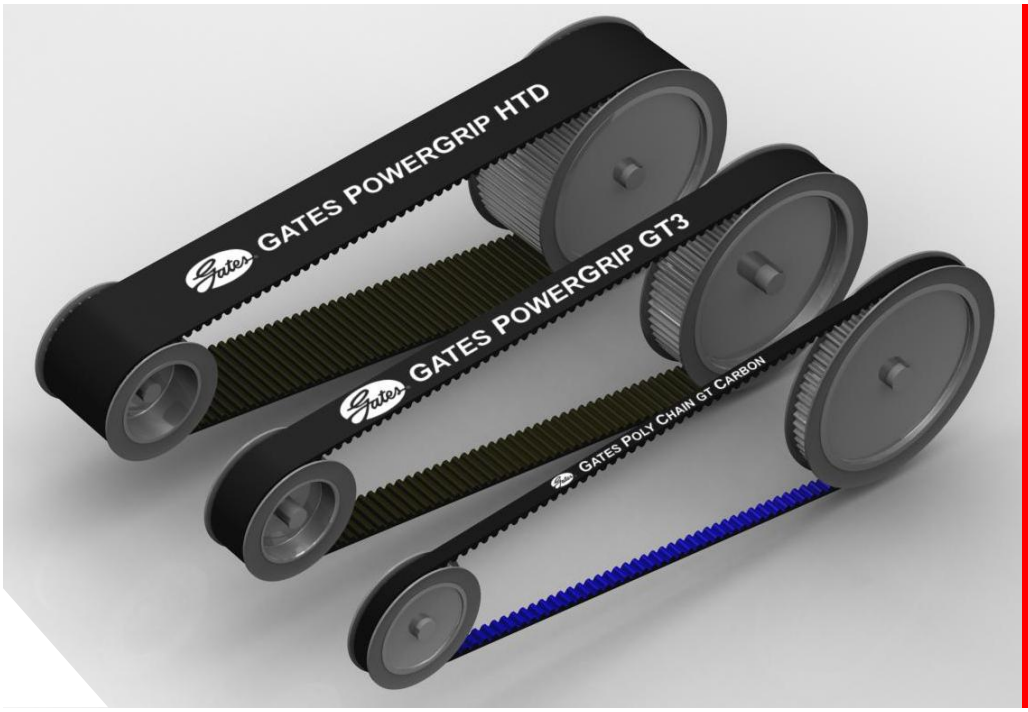
The below image is to scale and shows just how far belt technology has progressed and what is possible today.



PowerGrip® HTD
115mm wide
Rated @ 62kW

PowerGrip® GT3
55mm wide
Rated @ 64kW

Poly Chain® GT® Carbon™
20mm wide
Rated @ 55kW

What does all of this mean for you?

> Poly Chain® GT® Carbon™ belt drives have at least 4 times more capacity than a HTD belt drive.
> > This means HTD drives can be reduce to a ¼ of their current width.

> PowerGrip® GT3 belt drives have at least 2 times more capacity than a HTD belt drive.
> > This means HTD drives can be reduce to ½ of their current width.

> Weight savings due to much narrower sprockets (above example is a 30% & 61% saving)
> > Reduced weights mean lower overhung loads on shafts
> > Components are lighter and easier to install making it safer for staff

> The narrower drives have the same shaft load as the wider ones. This is because they all have the same diameter sprockets. It is actually better as the shaft load acts closer to bearings.

Another great feature of Poly Chain® GT® Carbon™ belts is that their unique construction makes them inert to water/moisture and all sorts of chemicals. They are ideal for cooling tower fan drives that are exposed to high moisture levels.

If you would like assistance in designing a new drive or to replace an existing one please contact gatestech@gates.com.

If you want to try it for yourself you can download our free design software, Design Flex® Pro™, from www.Gates.com/DesignFlex.

What are you waiting for? Experience the benefits of Gates belts for yourself.