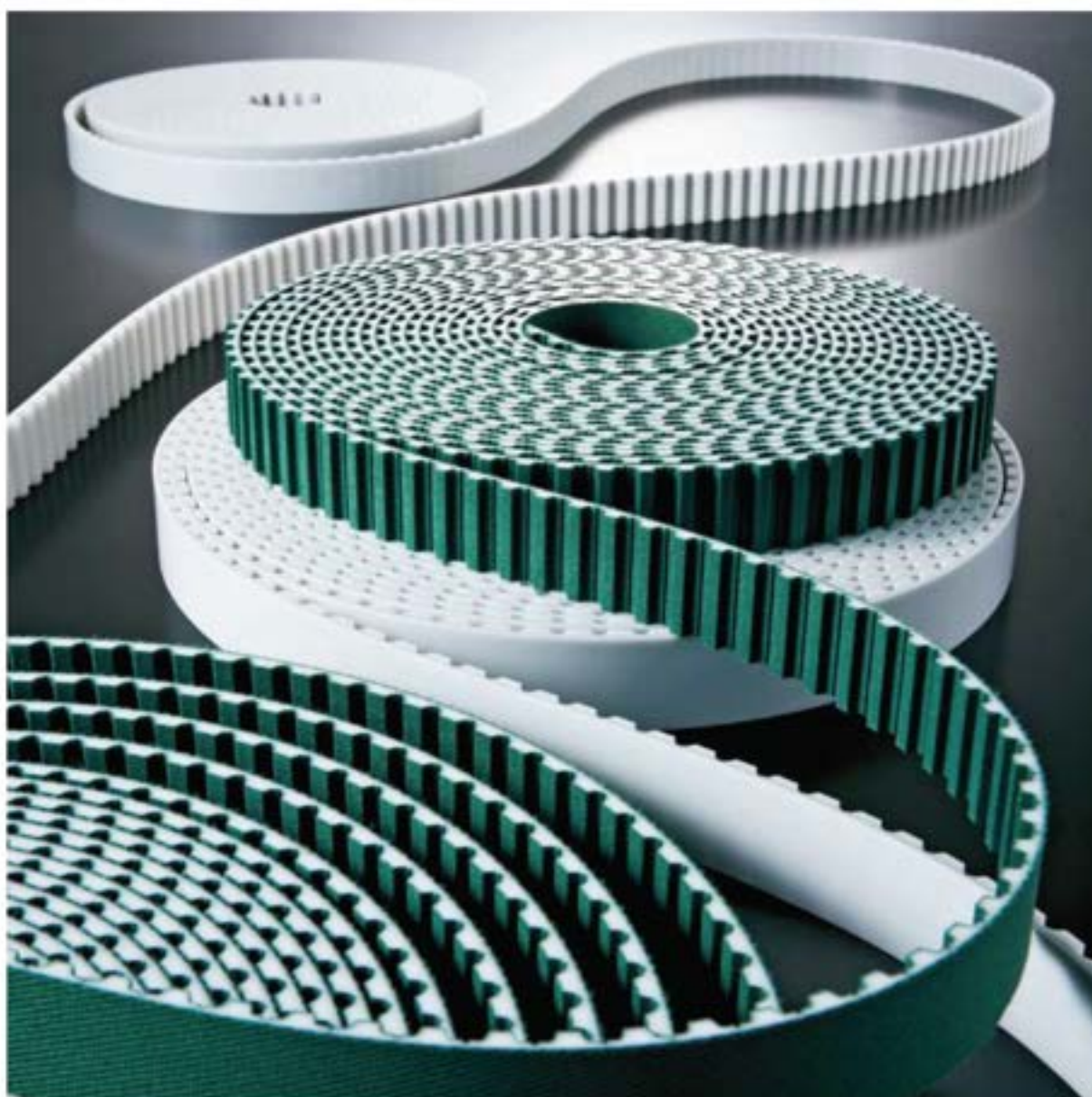




Polyurethane Timing Belt

# **FREESPAN<sup>®</sup> Belt**



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## Safety Precautions Please read all the warnings!

● Please take all necessary precautions when using our products. Also, Please review relevant product catalog and design documents, etc.

Significances of safety precautions are categorized as follows:

| Signs                                                                                              | Meanings                                                                    |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
|  <b>Danger</b>  | Imminently causing death or severe injury to the user who misuses products. |
|  <b>Warning</b> | Possibly causing death or severe injury to the user who misuses products.   |
|  <b>Caution</b> | Possibly causing personal injury or property damage if misused.             |

### Use

-  **Danger** ● If you expect that a belt will fail and idle, free-run, or stop the system, thus causing a fatal or severe accident, please provide an extra safety device.
- Do not use a belt as a lifting or towing tool.

-  **Caution** ● Do not use a belt as an insulator. Contact us for information on insulation properties, which vary in belt type.

### Function & Performance

-  **Caution** ● Do not use a belt beyond its capacity or for an application other than that specified by the catalog, design documents, etc. This can cause premature failure of the belt.
- If water, oil, chemical, paint, dust, etc. sticks to a belt or pulley, its power transmission could deteriorate and the belt may fail.
- A toothed belt makes louder noise during high-speed rotation. If this occurs, use a soundproof cover.

### Storage & Transportation

-  **Warning** ● To store a heavy belt, use a suitable jig or stopper to prevent accidents such as belt toppling or tumbling.

-  **Caution** ● Use suitable equipment to carry/handle a heavy belt or pulley. Otherwise, back injury may result.
- Do not put weight on or bend a belt forcibly to carry or store it. Otherwise, it will produce defects or scratches to the belt, resulting in damage.
- Store the belt in low humidity and a temperature range of -10°C to 40°C. Do not expose belts to direct sunlight.

### Mounting & Operation

-  **Danger** ● Install a safety cover over rotating components including belt/ pulley. Otherwise, hair, gloves and clothing can become entangled in the belt/ pulley. If a belt/pulley breaks, fragments may cause injuries.
- Take the following precautions to maintain, inspect and replace a belt.
- 1) Turn off power and wait until the belt and pulley have stopped completely.
  - 2) Secure machinery so that it may not move during belt removal.
  - 3) Use caution : Do not unintentionally turn on power.

-  **Caution** ● Use the same type of belts or pulleys per OEM specification. Use of a different type may cause premature failure.
- Misalignment of the pulleys can damage the belt and result in flange failure. Make proper adjustments to system.
- Loosen the belt tension when changing belts. Do not force or stretch a belt over the flange. Do not use a screw driver or other sharp objects into when replacing the belt as this will result in damage.
- Apply the appropriate belt tension as specified by the relevant catalog and design documents, etc. Inappropriate tension could result in damage of the belt and shaft.

### Handling of Used Items

-  **Caution** ● Do not burn belt, or hazardous gas could be produced.

# Introduction

FREESPAN™ Belt is polyurethane timing belt made by MITSUBOSHI Belting Ltd.

FREESPAN™ Belt consists of thermoplastic polyurethane and steel cords.

This belt is suitable for synchronous transportation and power transmission requiring accurate positioning.

The tension members are parallel to each other to ensure a suitable synchronous drive. Polyurethane also has good physical properties & good chemical resistance.

Belt Temperature range is from -30°C to +80°C.

## Structure

Polyurethane: ShoreA 92 Thermoplastic Polyurethane

Tension member: Zinc coated steel cords

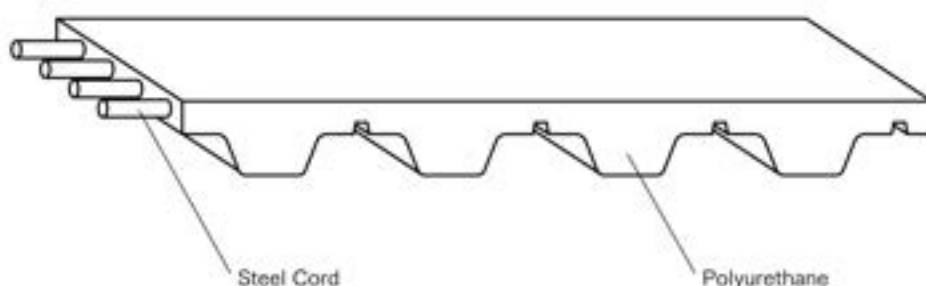


Table-1

## Mechanical Characteristics

- High Flexibility
- Length Stability
- Low Friction

## Material Characteristics

- Good Hydrolysis resistance
- Good Oil and Fuel resistance
- Good Abrasion resistance
- Good Weather resistance

| Chemicals |                       | Resistance |
|-----------|-----------------------|------------|
| Water     | Water                 | ○          |
|           | Salt Water            | ○          |
| Acid      | Acetic Acid           | △          |
|           | Hydrochloric Acid 20% | △          |
|           | Sulfuric Acid 25%     | △          |
|           | Nitric Acid           | ×          |
| Alkalis   | Ammonia 10%           | ○          |
|           | Sodium Hydroxide      | △          |
| Solvent   | Kerosene              | ○          |
|           | Acetone               | △          |
|           | Ethanol               | △          |
|           | Isopropanol           | △          |
|           | Methyl Ethyl Ketone   | △          |
|           | Gasoline              | △          |
|           | Methylene Chloride    | ×          |
|           | Toluene               | ×          |
|           | Diethyl Formamide     | ×          |
| Oil       | Mineral Oil           | ○          |
|           | Diesel Oil            | ○          |
| Grease    | Lubricating Grease    | ○          |

○ : Good  
△ : Limited  
× : Poor

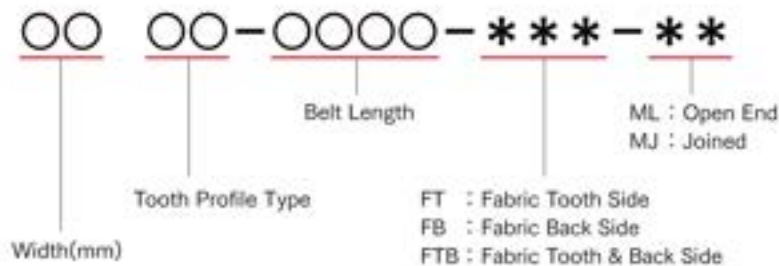
# Standard Belt Type and Belt Order Code

## Standard Line up

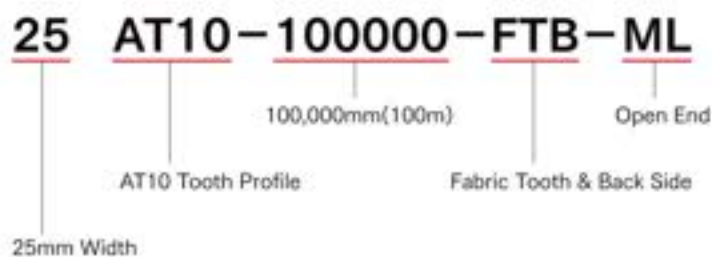
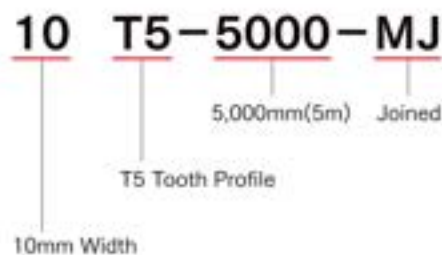
Table-2

| Tooth Profile | Cord  | Belt Type        | Fabric Type               | Max. Width |
|---------------|-------|------------------|---------------------------|------------|
| T5            | Steel | Open-End, Joined | Tooth, Back, Tooth & Back | 150mm      |
| T10           | Steel | Open-End, Joined | Tooth, Back, Tooth & Back | 150mm      |
| AT5           | Steel | Open-End, Joined | Tooth, Back, Tooth & Back | 150mm      |
| AT10          | Steel | Open-End, Joined | Tooth, Back, Tooth & Back | 150mm      |
| HTD 5M        | Steel | Open-End, Joined | ASK                       | 150mm      |
| HTD 8M        | Steel | Open-End, Joined | ASK                       | 150mm      |
| HTD 14M       | Steel | Open-End, Joined | ASK                       | 115mm      |

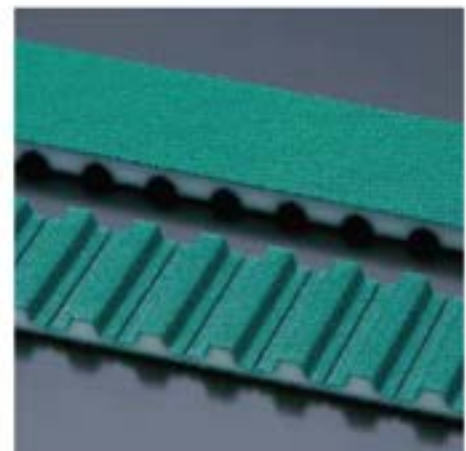
## Belt Order Code



### Example

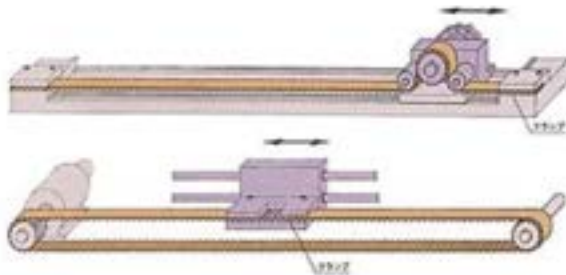


Available in any length (Up to 100m)

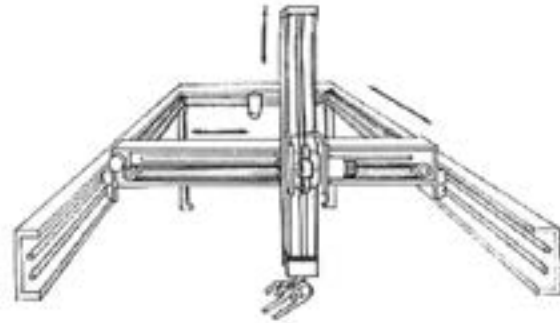


## Open End Applications

Linear Guide Positioning System  
Robot for Material Handling  
Automatic Door System (Elevators etc.)  
Lifting Machines  
Conveyers of Glass Plates for Displays (TV)  
Embroidery Machines  
Assembly Line for the Automotive Industry



● X-Y-Z drive



## Large Industrial Robot



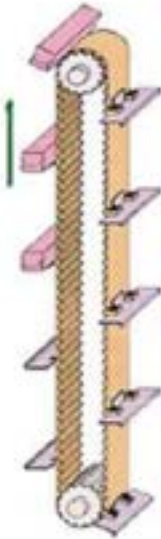
## Embroidery Machine



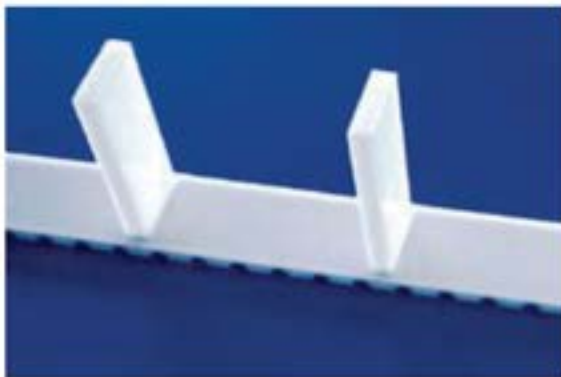
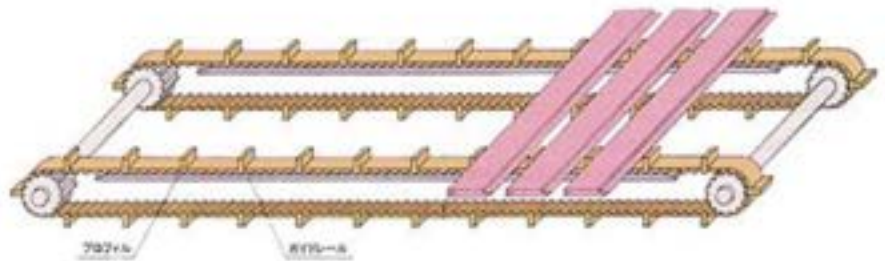
# Cleats Belt Applications

Packaging and Transfer System

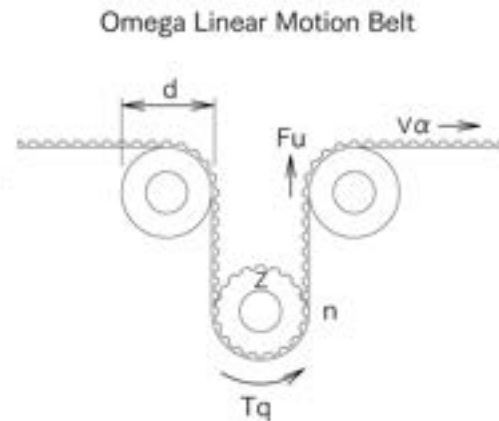
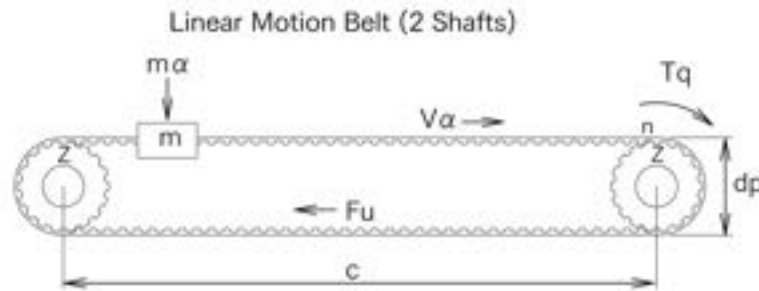
Vertical Conveyor



Level Conveyor Synchronous State



## Design Conditions



## Definition

Table-3

|          | Definition                 | Unit             |
|----------|----------------------------|------------------|
| $\alpha$ | Acceleration               | m/s <sup>2</sup> |
| Bw       | Belt Width                 | mm               |
| Ks       | Safety Factor              | -                |
| Zm       | Meshing Tooth Number       | -                |
| d        | Idler Pulley Diameter      | mm               |
| dp       | Pulley Pitch Diameter      | mm               |
| Fp       | Pretension                 | N                |
| Fu       | Peripheral Force           | N                |
| Fp spec  | Tooth Share Strength       | n/cm             |
| ATL      | Max Allowable Tensile Load | N                |
| BS       | Belt Breaking Strength     | N                |
| C        | Center Distance            | mm               |
| g        | Gravity                    | m/s <sup>2</sup> |
| $\mu$    | Coefficient of Friction    | -                |
| m        | Carriage Mass              | kg               |
| Tq       | Drive Torque               | Nm               |
| n        | Rpm of Pulley              | 1/min            |
| Pr       | Drive Power                | kW               |
| FR       | Friction Force             | N                |
| V        | Belt Speed                 | m/s              |
| Zd       | Pulley Groove Number       | -                |

## Useful Formulas

$$V = \frac{\pi \times dp \times n}{1000 \times 60} = \frac{dp \times n}{19100}$$

$$n = \frac{V \times 19100}{dp}$$

$$dp = \frac{V \times 19100}{n}$$

$$Tq = \frac{Fu \times dp}{2000}$$

$$Pr = \frac{Tq \times n}{9550}$$

$$Tq = \frac{9550 \times Pr}{n}$$



## Linear Motion Design Procedure (Example)

### Machine Condition

|                  |           |
|------------------|-----------|
| Center Distance  | 1000mm    |
| Pulley Diameter  | 75mm      |
| RPM              | 300rpm    |
| Motor Power      | 1.5kW     |
| Fluctuating Rate | Low → 1.4 |

### STEP 1 Choice of Belt Tooth Profile

According to the belt profile selection table, We can choose AT10  
Because Pulley diameter is 76mm, so  $Z=24$  (O.D=74.54)

### STEP 2 Calculation of the Peripheral Force

$$F_u = \frac{19.1 \times 1000000 \times P_r}{d_p \times n} = \frac{19.1 \times 1000000 \times 1.5}{300 \times 76.39}$$
$$= 1,250N$$

### STEP 3 Determination of the Belt Width

$$B_w = (F_u \times K_s \times 10) / (F_{spec} \times Z_m)$$

$$B_w = \frac{F_u \times K_s \times 10}{F_{spec} \times Z_m}$$

$$B_w = \frac{1250 \times 1.4 \times 10}{62 \times 12} = 23.5mm$$

$F_u$  Use above calculation result

$K_s$  Safety factor

$Z_m$  Number of tooth meshing in drive pulley

$Z_m$   $Z \times \text{arc of contact} / 360^\circ$

$F_{spec}$  Tooth share strength (N/cm)

So, the next closest width is 25mm → 25AT10 is selected.

### STEP 4 Calculation of the Pre-Tension

$$F_p = 2 \times F_u = 2 \times 1250 = 2500N$$

### STEP 5 Checking the Allowable Tension

25AT10 Maximum allowable tension is 3610N

$$\text{Maximum allowable tension} > F_p / 2 + (F_u \times K_s) = 1250N + 1250N \times 1.4 = 3000N$$

### STEP 6 Pulley Diameter and Idler Pulley Diameter check

Pulley & Idler pulleys are equal to, or bigger than the minimum pulley diameter.

$$Z_d = 24 > Z_{min} = 14$$

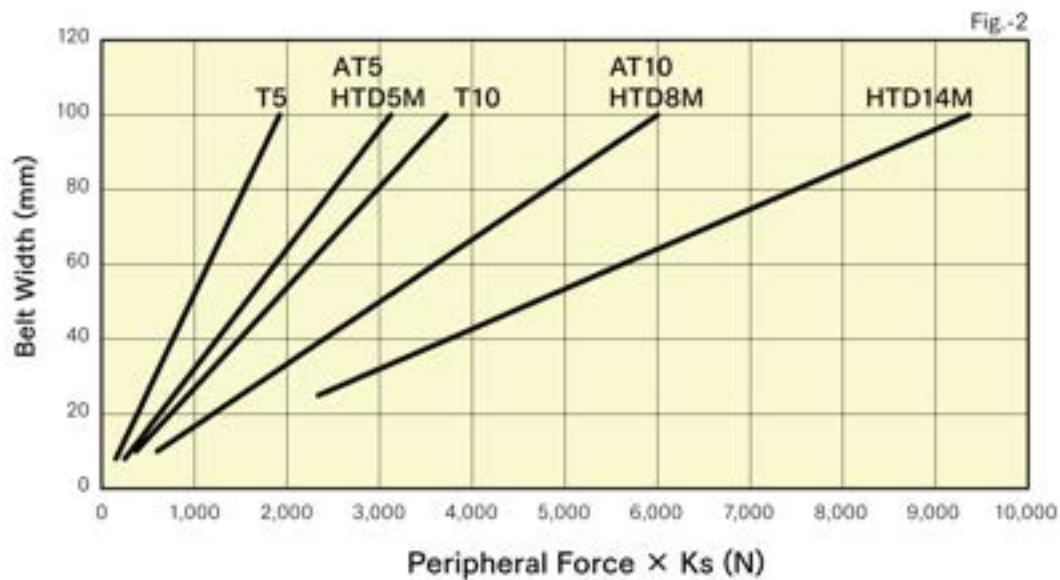
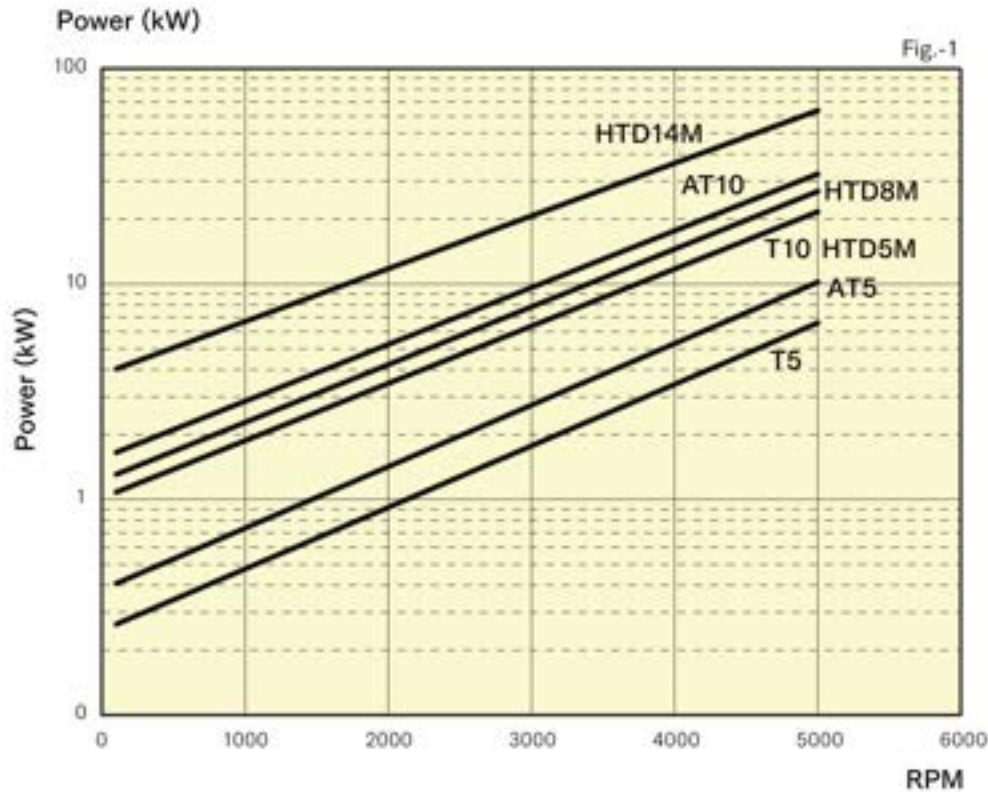
### STEP 7 Elongation

$$\Delta l = F_u / \text{Max allowable tension} \times (4/1000)$$

$$= 1250N / 3610N \times (4/1000) = 1.38mm / 1000mm$$

# Calculation Parameters

## Belt Tooth Profile Selection



This graph gives a indication of the belt width for each tooth profile.  
Please calculate the belt width followed by calculation procedure.

\*Graph condition is 1000rpm.

## Safety Factor

Safety factor depends on the operating conditions,  
Please use the following safety factor.

Table-4

| Operating Condition |        | Safety Factor |
|---------------------|--------|---------------|
| Steady Load         |        | 1.0           |
| Shock Load          | Low    | 1.4           |
|                     | Middle | 1.7           |
|                     | High   | 2.0           |

## Coefficient of Friction

When the supporting table is used,  
Please use the following Coefficient of Friction.

Table-5

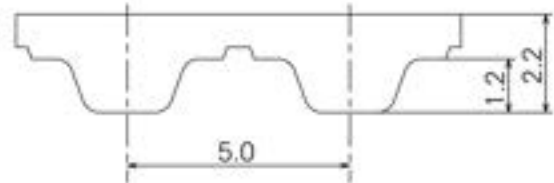
|           | Polyurethane |
|-----------|--------------|
| Steel     | 0.7          |
| Stainless | 0.7          |
| Aluminium | 0.4          |
| UHMW      | 0.3          |
| Teflon    | 0.2          |

## FREESPAN™ T5

Open End Belt  
Joined Belt

### Belt Characteristics

|                      |                                                     |
|----------------------|-----------------------------------------------------|
| Standard Color       | : White                                             |
| Polyurethane         | : Thermoplastic Polyurethane Shore A 92             |
| Standard Cords       | : S and Z zincked steel cords                       |
| Standard Thickness   | : 2.2mm                                             |
| Standard Roll Length | : 100m                                              |
| Belt Options         | : Joined Belt<br>Cleats<br>Fabric Type(FT, FB, FTB) |



### Belt Standard Width and Weight

|             |    |    |    |    |    |     |     |     |     |
|-------------|----|----|----|----|----|-----|-----|-----|-----|
| Width(mm)   | 8  | 10 | 16 | 25 | 32 | 50  | 75  | 100 | 150 |
| Weight(g/m) | 18 | 22 | 35 | 55 | 70 | 110 | 165 | 220 | 330 |

### Tooth Share Strength

|               |    |    |    |    |    |     |     |     |     |     |     |      |      |      |      |      |      |      |
|---------------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| rpm           | 0  | 20 | 40 | 60 | 80 | 100 | 200 | 300 | 400 | 500 | 750 | 1000 | 1500 | 2000 | 3000 | 4000 | 5000 | 8000 |
| Fp spec(N/cm) | 24 | 23 | 23 | 22 | 22 | 22  | 20  | 19  | 19  | 18  | 17  | 16   | 15   | 14   | 12   | 11   | 11   | 9    |

### Max Allowable Tension

|                            |      |      |      |      |      |      |       |       |       |
|----------------------------|------|------|------|------|------|------|-------|-------|-------|
| Width(mm)                  | 8    | 10   | 16   | 25   | 32   | 50   | 75    | 100   | 150   |
| Max Allowable Tensile Load | 278  | 324  | 556  | 834  | 1112 | 1667 | 2501  | 3335  | 5002  |
| Breaking Strength          | 1170 | 1365 | 2340 | 3510 | 4680 | 7020 | 10530 | 14040 | 21060 |

### Pulley

Minimum Pulley

|               | T5      |          |
|---------------|---------|----------|
| 2 Shafts      | φ 18.27 | 12 Teeth |
| Q Layout      | φ 27.82 | 18 Teeth |
| Inside Idler  | φ 30    | —        |
| Outside Idler | φ 30    | —        |

### Joined Belt

Minimum length : 1000mm

Tooth Share Strength and Max allowable Tension become 50%

Joined belt is suitable for transportation.

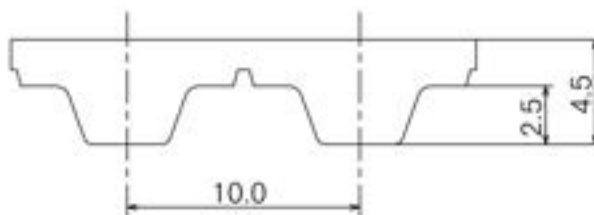
### How to order

**25 T5-100000-\*\*\*-\*\***

|            |                  |                 |                                                                                   |                              |
|------------|------------------|-----------------|-----------------------------------------------------------------------------------|------------------------------|
| 25         | T5               | 100,000mm(100m) | ***                                                                               | **                           |
| 25mm Width | T5 Tooth Profile |                 | FT : Fabric Tooth Side<br>FB : Fabric Back Side<br>FTB : Fabric Tooth & Back Side | ML : Open End<br>MJ : Joined |

### Belt Characteristics

|                      |                                                     |
|----------------------|-----------------------------------------------------|
| Standard Color       | : White                                             |
| Polyurethane         | : Thermoplastic Polyurethane Shore A 92             |
| Standard Cords       | : S and Z zincked steel cords                       |
| Standard Thickness   | : 4.5mm                                             |
| Standard Roll Length | : 100m                                              |
| Belt Options         | : Joined Belt<br>Cleats<br>Fabric Type(FT, FB, FTB) |



### Belt Standard Width and Weight

|             |    |    |     |     |     |     |     |     |
|-------------|----|----|-----|-----|-----|-----|-----|-----|
| Width(mm)   | 10 | 16 | 25  | 32  | 50  | 75  | 100 | 150 |
| Weight(g/m) | 45 | 72 | 113 | 144 | 225 | 338 | 450 | 675 |

### Tooth Share Strength

|               |    |    |    |    |    |     |     |     |     |     |     |      |      |      |      |      |      |      |
|---------------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| rpm           | 0  | 20 | 40 | 60 | 80 | 100 | 200 | 300 | 400 | 500 | 750 | 1000 | 1500 | 2000 | 3000 | 4000 | 5000 | 8000 |
| Fp spec(N/cm) | 51 | 49 | 48 | 47 | 46 | 45  | 41  | 39  | 37  | 36  | 33  | 31   | 28   | 25   | 22   | 20   | 18   | 14   |

### Max Allowable Tension

|                            |      |      |      |      |       |       |       |       |
|----------------------------|------|------|------|------|-------|-------|-------|-------|
| Width(mm)                  | 10   | 16   | 25   | 32   | 50    | 75    | 100   | 150   |
| Max Allowable Tensile Load | 698  | 1097 | 1796 | 2195 | 3591  | 5387  | 7182  | 10773 |
| Breaking Strength          | 2940 | 4620 | 7560 | 9240 | 15120 | 22680 | 30240 | 45360 |

### Pulley

Minimum Pulley

|               | T10     |          |
|---------------|---------|----------|
| 2 Shafts      | φ 42.71 | 14 Teeth |
| Q Layout      | φ 61.81 | 20 Teeth |
| Inside Idler  | φ 60    | —        |
| Outside Idler | φ 60    | —        |

### Joined Belt

Minimum length : 1000mm

Tooth Share Strength and Max allowable Tension become 50%  
Joined belt is suitable for transportation.

### How to order

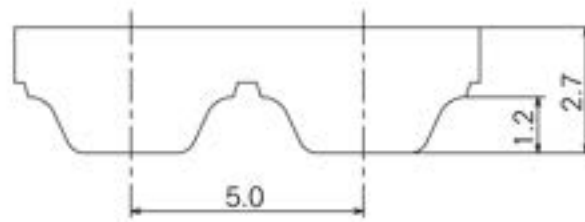
**25 T10-100000-\*\*\*-\*\***

25mm Width      T10 Tooth Profile      100,000mm(100m)      ML : Open End  
MJ : Joined

FT : Fabric Tooth Side  
FB : Fabric Back Side  
FTB : Fabric Tooth & Back Side

## Belt Characteristics

|                      |                                                     |
|----------------------|-----------------------------------------------------|
| Standard Color       | : White                                             |
| Polyurethane         | : Thermoplastic Polyurethane Shore A 92             |
| Standard Cords       | : S and Z zincked steel cords                       |
| Standard Thickness   | : 2.7mm                                             |
| Standard Roll Length | : 100m                                              |
| Belt Options         | : Joined Belt<br>Cleats<br>Fabric Type(FT, FB, FTB) |



## Belt Standard Width and Weight

|             |    |    |    |    |     |     |     |     |     |
|-------------|----|----|----|----|-----|-----|-----|-----|-----|
| Width(mm)   | 8  | 10 | 16 | 25 | 32  | 50  | 75  | 100 | 150 |
| Weight(g/m) | 26 | 33 | 53 | 83 | 106 | 165 | 248 | 330 | 495 |

## Tooth Share Strength

|               |    |    |    |    |    |     |     |     |     |     |     |      |      |      |      |      |      |      |
|---------------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| rpm           | 0  | 20 | 40 | 60 | 80 | 100 | 200 | 300 | 400 | 500 | 750 | 1000 | 1500 | 2000 | 3000 | 4000 | 5000 | 8000 |
| Fp spec(N/cm) | 35 | 35 | 35 | 34 | 34 | 34  | 32  | 31  | 30  | 29  | 27  | 26   | 24   | 22   | 19   | 18   | 16   | 13   |

## Max Allowable Tension

|                            |      |      |      |      |      |       |       |       |       |
|----------------------------|------|------|------|------|------|-------|-------|-------|-------|
| Width(mm)                  | 8    | 10   | 16   | 25   | 32   | 50    | 75    | 100   | 150   |
| Max Allowable Tensile Load | 542  | 677  | 1083 | 1692 | 2166 | 3384  | 5077  | 6769  | 10153 |
| Breaking Strength          | 2280 | 2850 | 4560 | 7125 | 9120 | 14250 | 21375 | 28500 | 42750 |

## Pulley

Minimum Pulley

|               | AT5     |          |
|---------------|---------|----------|
| 2 Shafts      | φ 22.64 | 15 Teeth |
| Ω Layout      | φ 38.56 | 25 Teeth |
| Inside Idler  | φ 30    | —        |
| Outside Idler | φ 60    | —        |

## Joined Belt

Minimum length : 1000mm

Tooth Share Strength and Max allowable Tension become 50%  
Joined belt is suitable for transportation.

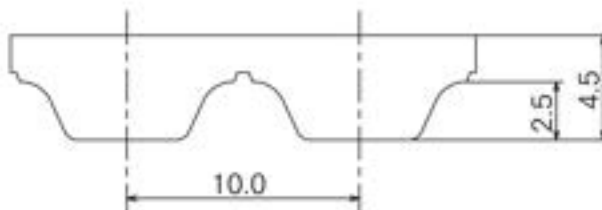
## How to order

**25 AT5-100000-\*\*\*-\*\***

|            |                   |                 |                                                                                   |                              |
|------------|-------------------|-----------------|-----------------------------------------------------------------------------------|------------------------------|
| 25mm Width | AT5 Tooth Profile | 100,000mm(100m) | FT : Fabric Tooth Side<br>FB : Fabric Back Side<br>FTB : Fabric Tooth & Back Side | ML : Open End<br>MJ : Joined |
|------------|-------------------|-----------------|-----------------------------------------------------------------------------------|------------------------------|

## Belt Characteristics

|                      |                                                     |
|----------------------|-----------------------------------------------------|
| Standard Color       | : White                                             |
| Polyurethane         | : Thermoplastic Polyurethane Shore A 92             |
| Standard Cords       | : S and Z zincked steel cords                       |
| Standard Thickness   | : 4.5mm                                             |
| Standard Roll Length | : 100m                                              |
| Belt Options         | : Joined Belt<br>Cleats<br>Fabric Type(FT, FB, FTB) |



## Belt Standard Width and Weight

|             |    |    |     |     |     |     |     |     |
|-------------|----|----|-----|-----|-----|-----|-----|-----|
| Width(mm)   | 10 | 16 | 25  | 32  | 50  | 75  | 100 | 150 |
| Weight(g/m) | 60 | 96 | 150 | 192 | 300 | 450 | 600 | 900 |

## Tooth Share Strength

|               |    |    |    |    |    |     |     |     |     |     |     |      |      |      |      |      |      |      |
|---------------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| rpm           | 0  | 20 | 40 | 60 | 80 | 100 | 200 | 300 | 400 | 500 | 750 | 1000 | 1500 | 2000 | 3000 | 4000 | 5000 | 8000 |
| Fp spec(N/cm) | 74 | 72 | 71 | 71 | 70 | 69  | 65  | 62  | 60  | 58  | 53  | 50   | 44   | 40   | 35   | 30   | 27   | 20   |

## Max Allowable Tension

|                            |      |      |       |       |       |       |       |       |
|----------------------------|------|------|-------|-------|-------|-------|-------|-------|
| Width(mm)                  | 10   | 16   | 25    | 32    | 50    | 75    | 100   | 150   |
| Max Allowable Tensile Load | 1354 | 2256 | 3610  | 4513  | 7220  | 10830 | 14440 | 21660 |
| Breaking Strength          | 5700 | 9500 | 15200 | 19000 | 30400 | 45600 | 60800 | 91200 |

## Pulley

Minimum Pulley

|               | AT10    |          |
|---------------|---------|----------|
| 2 Shafts      | φ 45.90 | 15 Teeth |
| Q Layout      | φ 77.73 | 25 Teeth |
| Inside Idler  | φ 50    | —        |
| Outside Idler | φ 120   | —        |

## Joined Belt

Minimum length : 1000mm

Tooth Share Strength and Max allowable Tension become 50%  
Joined belt is suitable for transportation.

## How to order

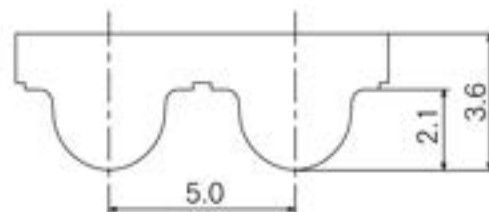
**25 AT10-100000-\*\*\*-\*\***

25mm Width      AT10 Tooth Profile      100,000mm(100m)      ML : Open End  
MJ : Joined

FT : Fabric Tooth Side  
FB : Fabric Back Side  
FTB : Fabric Tooth & Back Side

## Belt Characteristics

|                      |                                         |
|----------------------|-----------------------------------------|
| Standard Color       | : White                                 |
| Polyurethane         | : Thermoplastic Polyurethane Shore A 92 |
| Standard Cords       | : S and Z zincked steel cords           |
| Standard Thickness   | : 3.6mm                                 |
| Standard Roll Length | : 100m                                  |
| Belt Options         | : Joined Belt<br>Cleats                 |



## Belt Standard Width and Weight

|             |    |    |     |     |     |     |     |
|-------------|----|----|-----|-----|-----|-----|-----|
| Width(mm)   | 10 | 15 | 25  | 50  | 75  | 100 | 150 |
| Weight(g/m) | 41 | 62 | 103 | 205 | 308 | 410 | 615 |

## Tooth Share Strength

|               |    |    |    |    |    |     |     |     |     |     |      |      |      |      |      |      |      |
|---------------|----|----|----|----|----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| rpm           | 0  | 20 | 40 | 60 | 80 | 100 | 200 | 300 | 400 | 500 | 1000 | 1500 | 2000 | 3000 | 4000 | 5000 | 8000 |
| Fp spec(N/cm) | 37 | 36 | 36 | 35 | 35 | 34  | 33  | 31  | 30  | 29  | 26   | 24   | 22   | 19   | 17   | 16   | 12   |

## Max Allowable Tension

|                            |      |      |       |       |       |       |       |
|----------------------------|------|------|-------|-------|-------|-------|-------|
| Width(mm)                  | 10   | 15   | 25    | 50    | 75    | 100   | 150   |
| Max Allowable Tensile Load | 1031 | 1620 | 2651  | 5301  | 7952  | 10602 | 15903 |
| Breaking Strength          | 4340 | 6820 | 11160 | 22320 | 33480 | 44640 | 66960 |

## Pulley

Minimum Pulley

|               | HTD 5M  |          |
|---------------|---------|----------|
| 2 Shafts      | φ 22.28 | 14 Teeth |
| Ω Layout      | φ 30.23 | 20 Teeth |
| Inside Idler  | φ 50    | —        |
| Outside Idler | φ 50    | —        |

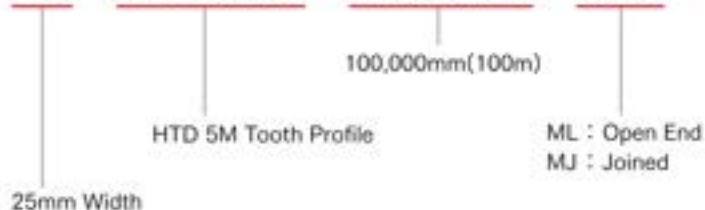
## Joined Belt

Minimum length : 1000mm

Tooth Share Strength and Max allowable Tension become 50%  
Joined belt is suitable for transportation.

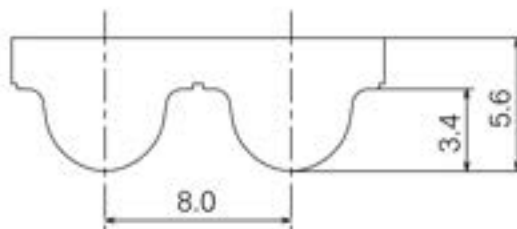
## How to order

**25 HTD 5M – 100000 – \* \***



## Belt Characteristics

|                      |                                         |
|----------------------|-----------------------------------------|
| Standard Color       | : White                                 |
| Polyurethane         | : Thermoplastic Polyurethane Shore A 92 |
| Standard Cords       | : S and Z zincked steel cords           |
| Standard Thickness   | : 5.6mm                                 |
| Standard Roll Length | : 100m                                  |
| Belt Options         | : Joined Belt<br>Cleats                 |



## Belt Standard Width and Weight

|             |    |    |     |     |     |     |     |     |
|-------------|----|----|-----|-----|-----|-----|-----|-----|
| Width(mm)   | 10 | 15 | 20  | 30  | 50  | 85  | 100 | 150 |
| Weight(g/m) | 59 | 89 | 118 | 177 | 295 | 502 | 590 | 885 |

## Tooth Share Strength

|               |    |    |    |    |    |     |     |     |     |     |      |      |      |      |      |      |
|---------------|----|----|----|----|----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| rpm           | 0  | 20 | 40 | 60 | 80 | 100 | 200 | 300 | 400 | 500 | 1000 | 1500 | 2000 | 3000 | 4000 | 5000 |
| Fp spec(N/cm) | 74 | 72 | 71 | 70 | 69 | 68  | 64  | 62  | 59  | 57  | 48   | 43   | 39   | 33   | 28   | 25   |

## Max Allowable Tension

|                            |      |      |       |       |       |       |       |       |
|----------------------------|------|------|-------|-------|-------|-------|-------|-------|
| Width(mm)                  | 10   | 15   | 20    | 30    | 50    | 85    | 100   | 150   |
| Max Allowable Tensile Load | 1354 | 2256 | 2708  | 4513  | 7220  | 12184 | 14440 | 21660 |
| Breaking Strength          | 5700 | 9500 | 11400 | 19000 | 30400 | 51300 | 60800 | 91200 |

## Pulley

Minimum Pulley

|               | HTD 8M  |          |
|---------------|---------|----------|
| 2 Shafts      | φ 50.93 | 20 Teeth |
| Ω Layout      | φ 76.39 | 30 Teeth |
| Inside Idler  | φ 50    | —        |
| Outside Idler | φ 120   | —        |

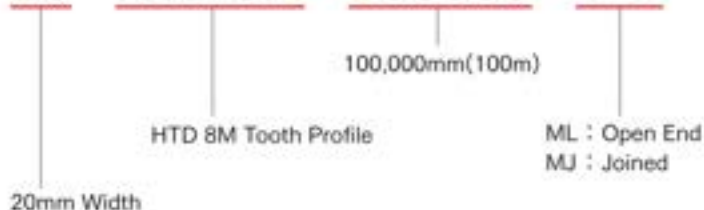
## Joined Belt

Minimum length : 1000mm

Tooth Share Strength and Max allowable Tension become 50%  
Joined belt is suitable for transportation.

## How to order

**20 HTD 8M-100000- \*\***

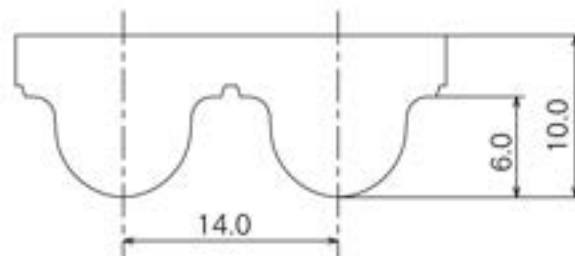


# FREESPAN™ HTD 14M

Open End Belt  
Joined Belt

## Belt Characteristics

|                      |                                         |
|----------------------|-----------------------------------------|
| Standard Color       | : White                                 |
| Polyurethane         | : Thermoplastic Polyurethane Shore A 92 |
| Standard Cords       | : S and Z zincked steel cords           |
| Standard Thickness   | : 10.0mm                                |
| Standard Roll Length | : 50m                                   |
| Belt Options         | : Joined Belt<br>Cleats                 |



## Belt Standard Width and Weight

|             |     |     |     |     |       |       |
|-------------|-----|-----|-----|-----|-------|-------|
| Width(mm)   | 25  | 40  | 55  | 85  | 100   | 115   |
| Weight(g/m) | 268 | 428 | 589 | 910 | 1,070 | 1,231 |

## Tooth Share Strength

|               |     |     |     |     |     |     |     |     |     |     |      |      |      |      |      |
|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| rpm           | 0   | 20  | 40  | 60  | 80  | 100 | 200 | 300 | 400 | 500 | 1000 | 1500 | 2000 | 3000 | 4000 |
| Fp spec(N/cm) | 130 | 128 | 126 | 123 | 122 | 120 | 110 | 104 | 99  | 95  | 78   | 67   | 59   | 47   | 38   |

## Max Allowable Tension

|                            |       |       |       |       |       |        |
|----------------------------|-------|-------|-------|-------|-------|--------|
| Width(mm)                  | 25    | 40    | 55    | 85    | 100   | 115    |
| Max Allowable Tensile Load | 5752  | 9039  | 12326 | 18900 | 23009 | 26296  |
| Breaking Strength          | 24220 | 38060 | 51900 | 79580 | 96880 | 110720 |

## Pulley

Minimum Pulley

|               | HTD 14M  |          |
|---------------|----------|----------|
| 2 Shafts      | φ 124.77 | 28 Teeth |
| Q Layout      | φ 124.77 | 28 Teeth |
| Inside Idler  | φ 120    | —        |
| Outside Idler | φ 180    | —        |

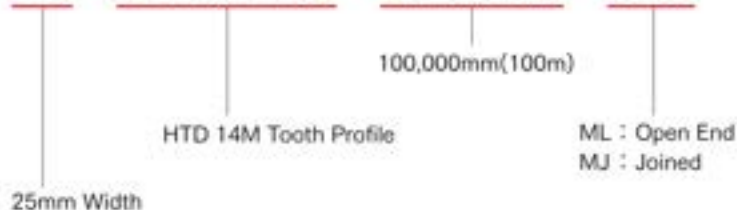
## Joined Belt

Minimum length : 1000mm

Tooth Share Strength and Max allowable Tension become 50%  
Joined belt is suitable for transportation.

## How to order

**25 HTD 14M-100000-\***



# Profile (Cleats)

Freespan belt can be welded variously shaped Cleats on the Belt.

## Cleats Material

Thermoplastic Polyurethane Shore A 92

## Standard Rectangle Cleats

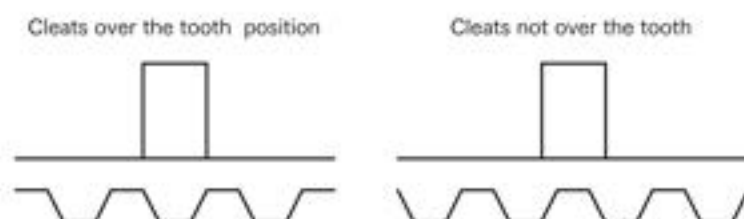
Thickness of cleats is available from 2mm to 10mm

Height of the cleats is available from 20mm to 50mm

## Position of the Cleats

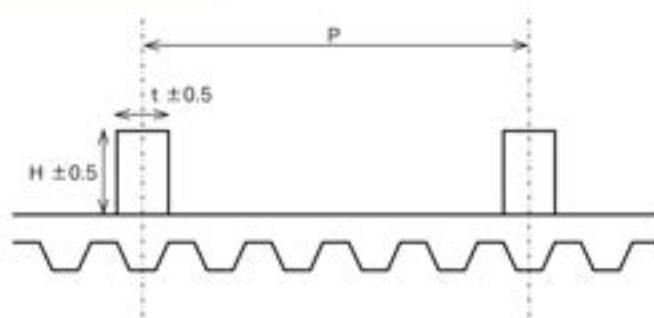
We recommend that Cleats should be mounted over the tooth position.

This position gives the better flexibility.



## Tolerance of the Cleats

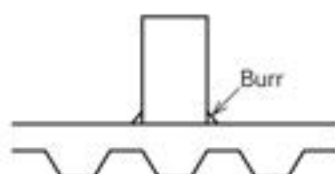
|                              |                 |         |
|------------------------------|-----------------|---------|
| Cleats thickness Tolerance   |                 | ± 0.5mm |
| Cleats Height Tolerance      |                 | ± 0.5mm |
| Tolerance of the position    |                 | ± 0.5mm |
| P: Cleats Pitch<br>Tolerance | ≤ 250mm         | ± 0.5mm |
|                              | 250mm < ≤ 500mm | ± 1.0mm |
|                              | 500mm <         | ± 2.0mm |



## Burr at welded Cleats

When the cleats are welded on the belt, The Burr tend to occurs at root of the Cleats.

If this burr interfere the function, please request us to remove the burr.



## Molded Cleats

We can produce the special cleats as follows.

If you need special cleats, please contact us.

