

TRAPEZOIDAL THREADED BARS WITH "STANDARD" PITCH AND COMPONENTS/ACCESSORIES

• CHARACTERISTICS OF OUR TRAPEZOIDAL THREADED BARS - Series "IF, FC, BID" LEFT (SX) AND RIGHT (DX):

The trapezoidal threaded bars listed in this catalogue are exclusively made by **Bimeccanica**, in Italy, by machining out of the bar using precision machine tools.

Normally, by **threaded bar**, we mean a semi finished product in that to consider it a finished product other processes are necessary, for example additional turning (machining) at the ends. To correctly define this product in relation to the phases of production reached we use the following terminology:

- **TRAPEZOIDAL THREADED BAR = semi finished product.**
- **TRAPEZOIDAL SCREW = finished product ready for assembly.**

Dealing with manual or motorised screw drive movements, for lifting and positioning, with sliding contact of their profiles, the field of application is mainly dependent on the maximum speed of travel, the load and lubrication. For correct use we recommend adhering to the data listed in the "Basic Theoretical Table" (see pages 14-15) together with the "Product Guide".

Our machined threaded bars have geometrically perfect threads with a specular finish which allow optimal sliding with low wear on the nut, especially if well lubricated with specific grease (see lubricants in Technical Catalogue GDM).

For maximum speeds we recommend bars in combination with nylon nuts for light loads or the more commonly used bronze nuts. The steel nuts, that should always well lubricated, are only used for manual movements and above all for static positioning.

When applications call for speeds or loads greater than those shown in our "Basic Theoretical Table" we recommend that technical tests are conducted to evaluate the start, the inertia and the motion time as the mechanism, even if well lubricated, in cases of excessive speed can overheat notably and with consequential wear. For high speed applications it is advisable to evaluate the use of recirculating ball screws.

The "STANDARD" threaded bars we produce are in accordance with ISO 2901 – 2902 – 2903 – 2904, equivalent to DIN 103. Furthermore, our threaded bars are produced as standard with diameters and pitch as provided by the previous standard UNIM 124 and exactly:

TR10x3, TR14x4, TR25x5, TR35x6, TR45x8 which form the most requested part of the range.

Our threaded bars are made to a **tolerance quality of 7e (tolerances listed in the the tables for every single item)** with accompanying nuts/lead nuts with **tolerances of 7H**. The geometry of the thread is 30° with excellent finish of the profile having a pitch quality of **class 100**. Normally our threaded bars and relative nuts/lead nuts are made with an average central diameter to ISO tolerances in order to guarantee good axial precision and alignment with the nut on assembly.

Warning: due to the geometry of the trapezoidal profile at 30° axial clearance corresponds to 1/3 of the radial play (for example: with radial play between the screw and the nut of 0,30 mm the axial play is 0,10 mm).

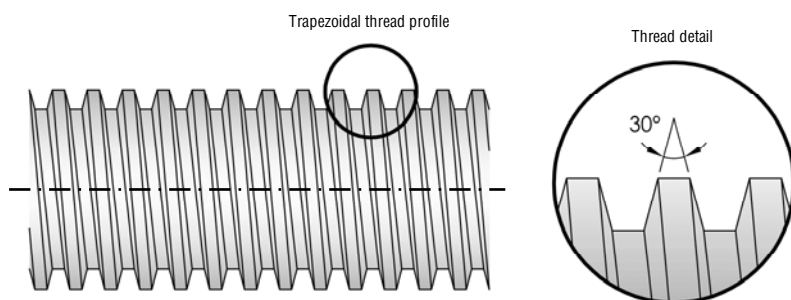
FOR MAINTAINING AND CONTROLLING AXIAL PLAY WE RECOMMEND EVALUATING OUR "LVZ" SUPPORTS FROM THE "COMPACT" TRANSMISSION DRIVE GROUPS AND "LXY" SUPPORTS FROM THE "EXCELLENT" GROUPS (OUR PATENTED SYSTEM) WHICH CAN BE FOUND IN OUR TECHNICAL GDM CATALOGUE.

To meet the diverse technical needs of mechanical trapezoidal screw transmissions, our company has expanded the range of types, and materials, of the threaded bars available from **ready stock**.

• MATERIALS:

The materials used in manufacturing of our threaded bars are all certificated, and being turning materials, facilitate the subsequent processes needed to machine to design every single screw directly on the lathe eliminating additional costs of rectifying work.

- **STEEL TRAPEZOIDAL THREADED BARS IN R50, R80, R100 NiCr (or R100 Cr.)**
- **STAINLESS STEEL THREADED BARS IN AISI 303, 304, 316.**
- **ALUMINIUM ALLOY THREADED BARS IN 6026.**



The special finish of our screws by machining out enables honed and geometrically perfect threads with a specular profile

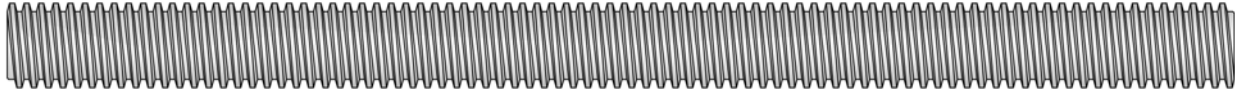
*All the bars are processed with a **7e tolerance on coupling** according to ISO 2901-2-3-4 and the pitch accuracy is in "**quality class 100**", that is quantifiable as **+/- 0,1 mm on 300 mm**.*

• TYPES OF THREADED BARS:

The trapezoidal threaded bars in the three versions illustrated below, and relevant materials, come in standard lengths, as listed in the following pages but can also be cut on request.

FULLY THREADED BARS (TR10/100) with defined "Standard" lengths.

IF SERIES

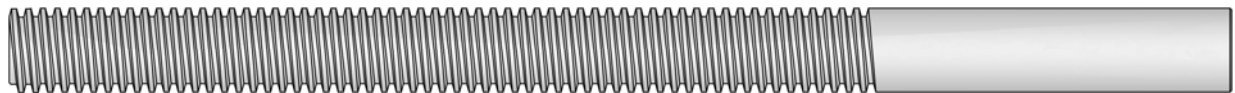


30° Trapezoidal Thread ISO 2901-2-3-4

The "STANDARD" ("IF" series) fully threaded bar is the most used and the most stocked in our warehouse. These bars are very versatile and highly customisable for the type of use intended, for example by turning the ends and using **Stop rings ABA/ABI** or even coupled with steel nuts pinned and welded using special electrodes to create a fixed support or guaranteeing a solid stop to the load in movement. The standard bars can also be cut to the length desired (see cutting department on page 44).

THREADED BARS WITH CYLINDRICAL SHANK h9/h11 (TR10/100) with defined "Standard" lengths.

FC SERIES



30° Trapezoidal Thread ISO 2901-2-3-4

Cylindrical shank h9/h11

The "STANDARD WITH CYLINDRICAL SHANK" threaded bars ("FC" series) are characterised primarily by being partially threaded and the other part being a **cylindrical shank** of the same nominal diameter of the threaded part, characteristics that can only be found on bars that have been machined out and which give the possibility of better fitting to supports, with the maximum diameter utilisable for load bearing and power takeoff.

We have foreseen the use of our cylindrical shanks with our **Threaded sleeve nuts MFA/MFI** where bearings can be fitted to the screw to support traction and, if necessary, in thrust. The fixing of the threaded sleeves can be done by pinning or by welding using special electrodes listed further ahead. At the trapezoidal threaded end **Stop Rings ABA/ABI** can be used as in the other threaded applications (see Ring and Sleeve Nut applications on pages 46-47).

BI-DIRECTIONAL BARS WITH dx/sx (RH/LH) THREAD (TR10/100) made from one piece with defined "Standard" lengths.

BID Series



RIGHT 30° Trapezoidal Thread ISO 2901-2-3-4

Cylindrical shank h9/h11

LEFT 30° Trapezoidal Thread ISO 2901-2-3-4

The bi-directional threaded bars ("BID" series) with opposing right/left threads with "Standard" pitch and central shank of the same nominal diameter of the screw offer the possibility of realising **bi-directional movements** with single motion that with rotation in one sense the two nuts become closer and with rotation in the other sense they become further apart. Even on the latter by turning at the end it is possible to use **Stop Rings ABA/ABI** which allow for perfecting fixing of supports to constrain axial and radial oscillations.

These three types of threaded bars, considering the vast range of materials in which they are made and with the breadth of diameters, distinguishes our "Standard" series not only for quality but also for the completeness of the range itself.

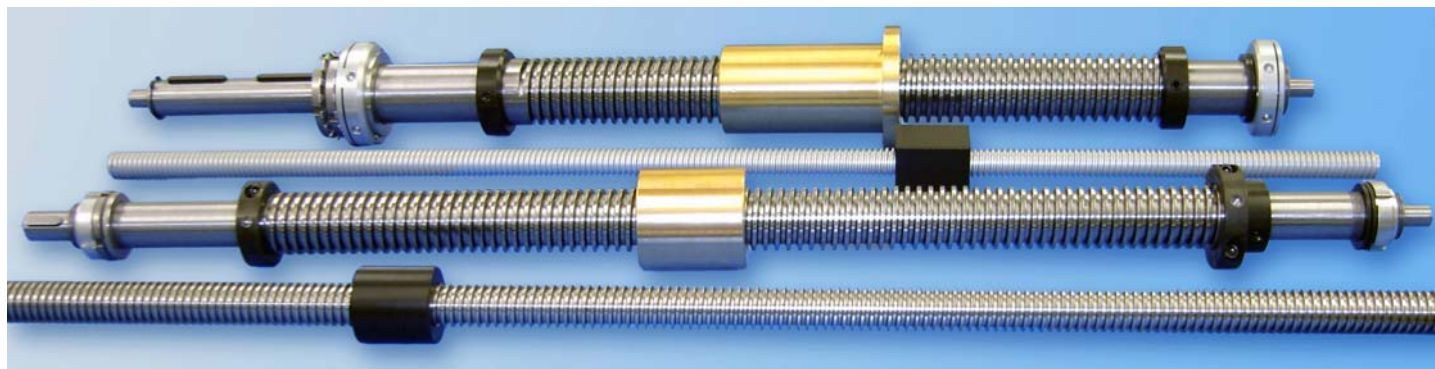
ALL OF THE ABOVE MENTIONED BARS CAN BE CUT TO OTHER LENGTHS ON REQUEST AS OUR WAREHOUSE HAS A SPECIAL CUTTING DEPARTMENT. The prices for custom length threaded bars can be obtained by using the calculation table shown in the price list. When requesting custom length bars we suggest **checking the availability of similar or longer lengths** lying in stock in our warehouse in that if available they would be **more economic and offer faster delivery times**. The trapezoidal threaded bars in R50, R80 and R100 steel, on request in quantities to be defined, and with the addition of any eventual custom work to design, are available with **nitriding surface treatment to harden the thread profile giving greater resistance on contact with the nut and against oxidising elements**.

• ACCESSORIES:

- **Stop Rings "ABA/ABI"** to use as a shoulder on all types of screw and above all on those completely threaded.
- **Threaded sleeve nuts "MFA/MFI"** to use as a shoulder for high axial grip on cylindrical shanks of the threaded bars, or on the diameter of the core "dn" of the screw itself.

Before selecting semi-finished products (bars with nut/lead nut) we suggest viewing our finished products in Technical Catalogue GDM where we offer pre-built innovative products to facilitate and accelerate the complete creation of trapezoidal screw drive movement mechanisms and with custom lengths depending on the travel required (see our website: www.bimeccanica.it).

Trapezoidal threaded bars with nuts/lead nuts and screws with machined terminals, complete with accessories presented further ahead.



• USES OF OUR TRAPEZOIDAL THREADED BARS AND THE CHARACTERISTICS OF THE MATERIALS USED

• Distinction of the various materials by means of Bimeccanica colour coded label and product code.

– Steel R50 11SMnPb37 - W.NR: 1.0737 - (product packed with “Bimeccanica” beige tape).

General use for low and medium load mechanical transmissions with optional nitriding surface treatment to harden the thread profile for greater wear resistance to the nut and against oxidising agents.

Steel with excellent machine tool processing due to the presence of sulphur and lead that enable a specular thread to be achieved as well as good machine finishing of the screw terminals. Because of the sulphur and lead content it is not particularly suitable for welding, however it is possible to weld a threaded sleeve on the shank with good results using *Castolin “EC 4080”* electrodes which we can supply. In cases where welding is necessary in particularly risky load bearing situations we recommend contacting our technical department who can advise on additional items to increase the efficiency of grip. Mechanical resistance 460/650 N/mm², HB 120/200.

– Steel R80 36SMnPb14 - W.NR: 1.0765 - (product packed with “Bimeccanica” green tape).

Qualified for use with medium and heavy load mechanical transmissions, and with optional nitriding surface treatment for achieving a harder and more oxidant resistant finish than the R50 above. Steel with good machine tool processing due to the presence of sulphur and lead. As far as welding is concerned it presents the same problems as the R50 above which can be addressed by using the same *Castolin “EC 4080”* electrodes. In cases where welding is necessary in particularly risky load bearing situations we recommend contacting our technical department for advice as mentioned above.

Mechanical resistance 580/840 N/mm², HB 170/250.

– Steel R100 39NiCrMo3 hardened and tempered - W.NR: 1.6510 - (product packed with “Bimeccanica” blue tape).

Specifically for use with vertical, heavy load, mechanical transmissions in safety.

This type of hardened and tempered steel has an excellent structure without cracks or internal porosity. Machine tool processing is easy thanks to the presence of nickel. If nitriding treatment is required for the threaded bar it is certainly better to ask for steel without nickel (42CrMo4) as better thread wear resistance is obtained extolling the features described above on steels R50 & R80. The nitriding, if carried out on steel 39NiCrMo3, will in any case render good results, especially if evaluated as protection against oxidizing agents, but wear resistance of the thread profile is slightly lower. For availability reasons R100 42CrMo4 steel threaded bars are sometimes supplied as an alternative to 39NiCrMo3, with specification being made on the order confirmation, as they have identical mechanical properties. These two types of steel can be welded, always with appropriate evaluation, using the same, above mentioned, *Castolin “EC 4080”* electrodes. To obtain the maximum efficiency of the weld tightness on all of the above steels we recommend no rapid cooling of the part just welded.

Mechanical resistance 930/1080 N/mm², HB 260/330.

– Stainless Steel AISI 303 18/08 - W.NR: 1.4305 - (product packed with “Bimeccanica” yellow tape).

Steel for general use where stainless resistance to atmospheric agents is required. It is easier to process than AISI 304 & 316 stainless steel due to the presence of sulphur, distinguished for better economy of the finished product and is the most used with the exception of the following:

Should not be used in the food sector if it is in contact with food due to the presence of sulphur and is also not recommended for the pharmaceutical, or winery sectors or if in the presence of corrosive chemicals or marine use. Good welding stability using *Castolin “33500”* electrodes.

Mechanical resistance 500/850 N/mm², HB 230 max.

– Stainless Steel AISI 304 18/10 - W.NR: 1.4301 - (product packed with “Bimeccanica” red tape).

Steel for a wide ranges of applications especially in the food, wine and pharmaceutical sectors, where, other than resistance to atmospheric agents, it also has resistance to chemical agents. It is in fact indicated for use in pharmaceutical, chemical, leather tanning, paper making and, in particular, for the food and wine sectors in that it can be used in contact with foodstuffs. Good welding stability using the same *Castolin “33500”* electrodes.

Mechanical resistance 580/850 N/mm², HB 215 max.

– Stainless Steel AISI 316 18/12 - W.NR: 1.4401 - (product packed with “Bimeccanica” light blue tape).

Steel specifically for use in nautical/marine and chemical sectors and ideal for applications in the presence of corrosive agents. The strong presence of Molybdenum besides the characteristics already mentioned for AISI, provides further resistance to highly aggressive agents, making it suitable for the nautical sector and in contact with corrosive chemical elements. Good welding stability using the same *Castolin “33500”* electrodes. To obtain the maximum efficiency of the weld tightness we recommend no rapid cooling of the part just welded.

Mechanical resistance 500/850 N/mm², HB 215 max.

– Aluminium alloy 6026 T6 - 2000/53/CE - 2002/95/CE - (product packed with “Bimeccanica” orange tape).

For use in low load situations requiring lightness - coupled with nylon nuts. Material with notable corrosive resistance if anodized.

Suitable for various industries in applications where light weight is important and in many cases, for light loads, it can be an alternative to stainless steel.

Good welding stability using *Castolin “EC 4001”* electrodes.

Mechanical resistance 300/350 N/mm², HB 90/100.