A guide to PET (Polyethylene Terephthalate)

Material Grades & Applications

Ertalyte – Where Material and Solutions Innovation Meet

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Your Requirements

"I need a material which offers the highest purity. Our goal is to exclude anything that could possibly impact the properties and the final quality of the product we offer. Mechanical and optical aspects matter a lot in our environment."

"I am in search of a polymer material which can be machined to the maximum precision, allowing me to deliver on very special parts designs."

"We are increasingly emphasising the ecological aspects of our processes and are setting specific goals throughout the company. I need materials which contribute to these goals at various points in the organisation. We are thinking of significantly reducing – or better eliminating – external greasing of machines and components. Plus, to further protect the health of our workers and the environment, we are looking for a solution which supports the reduction of noise caused by the simple motion of the equipment during operation."

"I am looking for a material for replacement machine parts in the food production process. Most importantly, it needs to operate under elevated temperatures, and the constant exposure to moisture should not impact the materials' mechanical and electrical qualities. Clearly it needs to be approved for food contact under standard regulations by the public bodies globally."

"Can you offer a material grade which hardly ever breaks and is tested specifically on strength and low stresses? We now really need to reduce costs of materials and productivity deficits caused by equipment maintenance or too frequently happening breakdowns of equipment parts."

"Our sensitive business requires high performance materials for process equipment parts which can withstand various chemicals over a long life-time. In the past we had to replace critical parts too frequently, and at considerable expense. We are looking for a solution to this situation – a high quality and safe material which allows us to save costs."

Are you finding some of your business or technological requirements represented here? While these are only a few examples of the typical application demands our customers ask us to help with, the answer to these and many more is Ertalyte or Ertalyte TX.

The combination of comprehensive understanding of your challenges, a portfolio of highest quality materials and innovative technology allowed for the development of one of the most searched for polymer materials in the industry. The result is a customised and tested solution that meets your expectations and can help you to turn challenges into advancement.

The following brief application examples will demonstrate the versatility of our materials. These application descriptions offer you a start for further ideas and solutions, which can then be applied to your specific environment.

Our Solutions

Pharmaceutical – Pill Processing

During the production of pharmaceutical tablets, the product gets diverted into specific process streams using a diverter arm. These arms must remain very stable and straight over their life. The company producing these arms had been machining them from Hydex PBT but had been struggling to hold the required flatness tolerance. The design of the parts includes a taper at one end of the “hockey stick” shape (blade end). The overall thickness in the body of the part is 4.83mm and it tapers to 0.89mm at the dip. Despite machining material off both sides of the plate, they could not keep the parts flat after machining. Ertalyte delivered on all requirements and was chosen as the replacement material.

Why Ertalyte?

- Better Machinability
- Fewer rejects from black specs
- FDA approval

Desalination – Watermaker Equipment

The principle of this equipment, which is used for producing drinkable water (desalination) in equipment on ships, is based on reverse osmosis. The function of this equipment is to take advantage of the 60 bars high pressure required to produce drinkable water from sea water. The production of drinkable water is done in a big chamber made of 2 cavities: one for drinkable water and the other for sea water. A filter is positioned between the 2 cavities. The water can go from one cavity to the other crossing the filter by osmotic pressure. The equipment is a double pressure way type. After pushing the water through the filter to one of the cavities, the high pressure is conserved and returns back into the other cavity. To allow this double function, a collector with an internal piston is required. The piston has a specific design incorporating a reciprocating movement, allowing the pressure to go from one way to the other, and consequently reverse the pressure from one circuit to the other.

Why Ertalyte?

- Good behaviour of the piston in use
- Good chemical properties
- Excellent wear and abrasion resistance
- Stability and lower weight

Food – Commercial Ice Production Facility

Considerable production volume increase during the “dog days of summer” motivated a commercial ice producer to contact us. Top speed production required improved materials for equipment parts; specifically a replacement material for metal used as a flanged bearing n a shaved ice commercial production facility. The metal parts were failing prematurely due to galling and excessive wear. Recommendation: Ertalyte. With Ertalyte PET-P based bearings; they can beat the heat and deliver more quickly to the ice cream stands around.

Why Ertalyte?

- Ideal for both wet and dry environments
- High strength and rigidity – ideal for close tolerance parts
- Excellent stain resistance
- Good wear resistance and excellent dimensional stability
- Better resistance to acids than nylon or acetal

Transportation – Railroad Passenger Cars

Trams are used for public transport at the Belgian coast. The trains consist of three main parts (trolleys): One front part, one end part with a steering table and in between a third floating part. Bearings provide the trolleys the flexibility to follow the rails in a curved or a sloped track. A disk enables the horizontal turning of the train while cylindrical bearings allow a vertical flexibility when on sloped track. Both equipment parts, the trolley pivot disc and the cylindrical bearings, are now made of Ertalyte, replacing “Permaglide” (PTFE coated steel bearing material) as a result of the better performance.

Why Ertalyte?

- Better wear resistance enabling longer life time
- No noise – Permaglide bushings were making noise once the Teflon coating has been worn out completely
- Less electrical problems as a result of better electrical insulation

Industrial – Knitting Mill

More profits by increasing productivity and reducing downtime – these were the top objectives of the customer, a knitting mill operator. The spacer block is utilised in part of the manufacturing process where several threats are brought together into one strand. The prior metal/alloy material was wear resistant but frequently damaged the product and created noise. This Ertalyte TX PET-P bearing offered outstanding wear resistance, easy fabrication and was resistant to dyes and other chemicals present in the production environment. Ertalyte TX also was capable of maintaining the tight tolerances needed in this precise process.

Why Ertalyte?

- Outstanding wear resistance
- Non-staining
- Excellent dimensional stability
- FDA compliance
- Noise reduction

Food – Belt Rollers for Bakery Products

In this application, before the bakery products are baked, they are transported and positioned by belt transportation systems at high speeds (15m/min, up to 40m/min in other systems). These systems can create varying space between the separate products, or help to orient them. As the products can be fairly small, the transition between one belt and the next needs to be as smooth as possible, therefore the belt roller at the end should have the smallest possible diameter. The goal is to prevent foodstuff falling down between the two belts. In the past this part was designed as a hollow steel shaft, rotating on needle bearings. Due to USDA standardisation, the machine cleanability had to be improved, hence this OEM chose sliding bearings instead. Ertalyte TX was the material of choice as it resulted in less noise, between other key benefits.

Why Ertalyte?

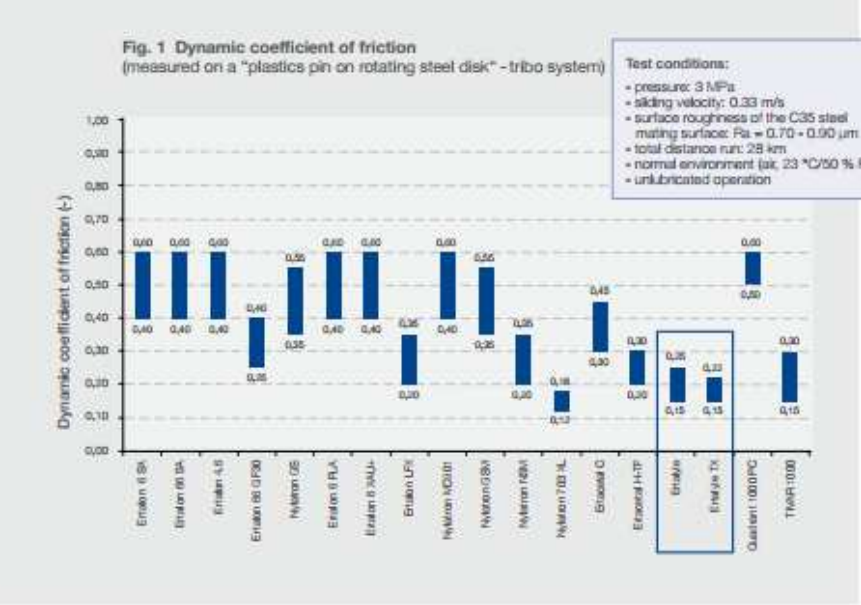
- Good chemical resistance against cleaning agents
- Good dimensional stability
- Very low wear
- Low coefficient of friction
- High PV values (belt speed varies from 15 to 40 m/min)
- FDA compliant
- Low noise

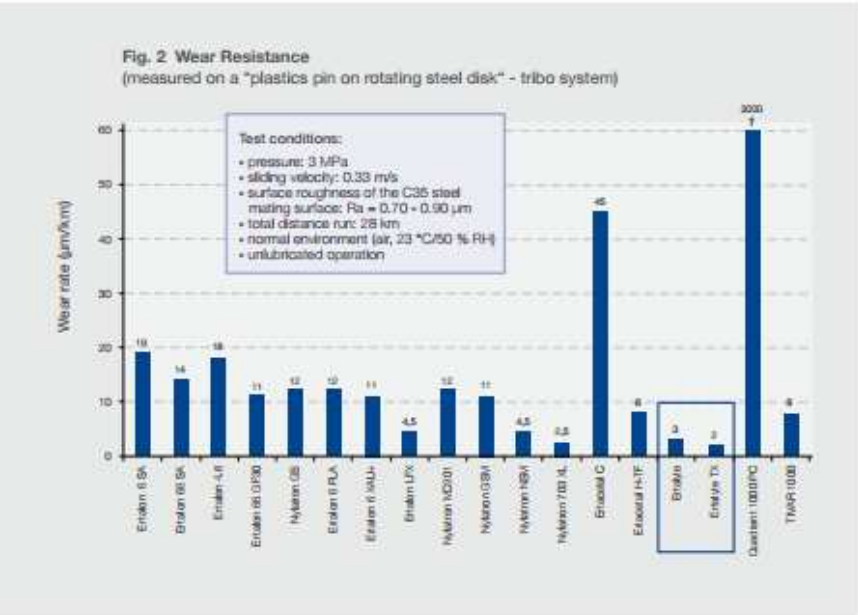
Ertalyte Materials – Polyethylene Terephthalate (PET)

Stock shapes made of crystalline thermoplastic polyester are marketed under the trade names Ertalyte (virgin grade) and Ertalyte TX (bearing grade).

Main Characteristics

- High mechanical strength, stiffness and hardness
- Very good creep resistance
- Low and constant coefficient of friction
- Excellent wear resistance (comparable with or even better than nylon grades)
- Moderate impact strength
- Very good dimensional stability (better than polyacetal)
- Excellent stain resistance
- Better resistance to acids than nylon and polyacetal
- Good electrical insulating properties
- Physiologically inert (food contact compliant composition)
- Good resistance to high energy radiation (gamma and X-rays)
- Available as “food grade”





Ertalyte (PET) – natural / black

The specific properties of this virgin crystalline PET make it especially suitable for the manufacture of mechanical precision parts which have to sustain high loads and/or are subject to wear.

Ertalyte TX (PET + solid lubricant) – pale grey

Ertalyte TX is a polyethylene Terephthalate compound incorporating a uniformly dispersed solid lubricant.

Its specific formulation makes it a premium internally lubricated bearing-grade. Ertalyte TX not only has got an outstanding wear resistance, but offers in comparison with Ertalyte an even lower coefficient of friction as well as higher pressure-velocity capabilities.

Tech Notes:

Since Ertalyte tends to be rather notch and impact sensitive, all “internal” corners should be radiused (R>1mm) and to avoid chipping the edges during turning, boring or milling, chamfered edges are advantageous, providing a smoother transition between the cutting tool and the plastics work.

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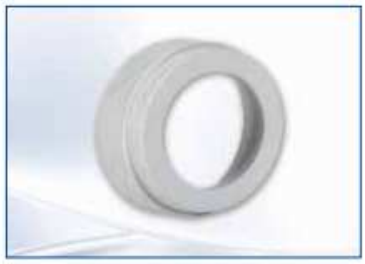


Ertalyte & Ertalyte TX – Material of choice for the most challenging applications.

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