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# CELANESE TOOTHBRUSH FILAMENTS

## ORAL CARE OFFERING



## SUPERIOR PERFORMANCE & MAXIMUM DESIGN FLEXIBILITY

With outstanding industry expertise accumulated over the years, coupled with our proven technologies, Celanese filaments is dedicated to the oral care brush industry with our solutions under the brand names of Tynex® (nylon 612), Herox® (nylon 610), and Kulex®(PBT) . Leading toothbrush brands and manufacturers are able to produce very high quality brushes with a balance of consistent quality, wear performance and unmatched productivities in tufting and end-rounding by using products from Celanese filaments.

Since introducing nylon to toothbrush applications, Celanese filaments has been providing premium quality filaments to the oral care industry for over 80 years. Our continuous pioneering contribution in innovative synthetic filaments allows us to address consumer trends and help our partners exceed their consumers' expectations.

Celanese filaments come in various sizes, shapes and colors for the broad range of electric and manual toothbrushes, interdental brushes, and tongue brushes.

Tynex® (nylon 612) filaments, Herox® (nylon 610) filaments, Kulex® (PBT) filaments offer you, the oral care brush maker/marketer, a reliable source for your raw materials.

Long lasting, premium quality Tynex® (nylon 612) filaments offer a variety of synthetic filament options for premium oral care brushes. In clinical studies, Celanese filaments continue to show excellent wear performance and greater bend recovery compared with other materials. The precise control over our production process ensures that Celanese filaments feature optimal end-rounding for greater comfort.

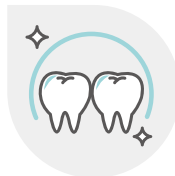
Celanese filaments enhance your ability to design versatile and innovative products with specially engineered shapes and textures to meet your specific development requirements. With almost limitless choices of textured surfaces, variable lengths and unique colors, you can enjoy maximum versatility in your product designs.

## CONSUMER NEEDS OF ORAL CARE & OUR SOLUTIONS

**Visual Attractiveness, Interdental Cleaning, Plaque Removal, Gum Comfort, Gingival Cleaning, Anti-microbial and Consumer Habit Management** have always been major needs of the oral care brush market. Celanese Filaments has developed a series of filament solutions to fulfill different consumer needs.



**Visual Attractiveness**



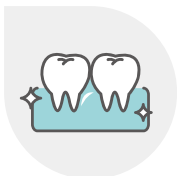
**Interdental Cleaning**



**Plaque Removal**



**Gum Comfort**



**Gingival Cleaning**

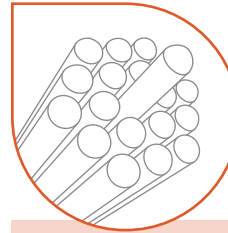


**Anti-microbial**



**consumer habit management**

## TYNEX® CLASSIC (0900HA)



Premium quality filament (nylon 612) offers a variety of synthetic filament options for all oral care brush applications.

### Benefits

Enhanced durability for long-lasting maximum cleaning performance for premium toothbrushes.

### Product Description

● Solid round level filament

### Colors

- 70 standard colors
- Custom colors available

### Diameters

- 0.127mm – 0.356mm (5mil – 14mil)

### Bundle Packaging

- Paper spiral wrap
- Plastic spiral wrap
- Plastic sleeve

### Bundle Length

- Full hanks – 1168mm
- Custom cut piece lengths available

### Technology

- Good stiffness
- Excellent bend recovery

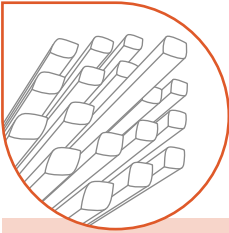
### Values

- FDA/EU compliant
- Multiple production plants for global supply
- Consistent quality

### FULFILLING CONSUMER NEEDS:



## TYNEX® BRILLIANCE (0990HA)



A unique shape that allows for more light refraction, producing shiny colors.

### Benefits

Wedge-shaped profile gets between teeth below gumline.  
Four facets to reflect light.

### Product Description

- Solid diamond cross-section
- Level solid filament

### Colors

- 17 standard colors

### Diameters

- 0.127mm – 0.254mm  
(5mil – 10mil)

### Bundle Packaging

- Paper spiral wrap
- Plastic spiral wrap
- Plastic sleeve

### Bundle Length

- Full hanks – 1168mm
- Custom cut piece lengths available

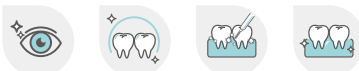
### Technology

- Unique diamond shape enhances appearance
- Light reflects to highlight color

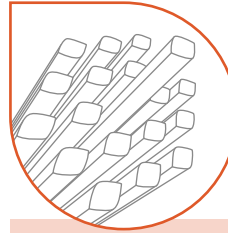
### Values

- FDA, EU compliant
- Multiple production plants for global supply
- Consistent quality Sparkling appearance
- Improved inter-dental cleaning
- Improved cleaning

### FULFILLING CONSUMER NEEDS:



## TYNEX® BRILLIANCE PRO (7990HA)



A unique shape with a special color recipe that allows for more light refraction, producing unique and superior translucent colors.

### Benefits

Unique color, outstanding translucency, great glistening look brought by superior techniques, special color recipe and classic diamond shape stimulates consumers' perception of functional performance of a toothbrush e.g. "better cleaning".

### Product Description

- Solid diamond cross-section
- Level solid filament

### Colors

- 5 standard colors
- More colors are under development

### Diameters

- 0.127mm – 0.203mm  
(5mil – 8mil)

### Bundle Packaging

- Paper spiral wrap
- Plastic spiral wrap
- Plastic sleeve

### Bundle Length

- Full hanks – 1168mm
- Custom cut piece lengths available

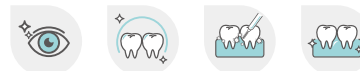
### Technology

- Unique diamond shape enhances appearance
- Special color recipe creates unique color and excellent translucency
- Light reflects to highlight color
- More softness compared to Tynex® Brilliance

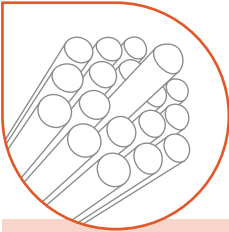
### Values

- FDA, EU compliant
- Consistent quality
- Distinguished colors for premium toothbrushes
- Superior advantages in all-around cleaning
- Comfort to enhance teeth-brushing experience

### FULFILLING CONSUMER NEEDS:



## TYNEX® STACLEAN™ (2900HA)



Enhanced durability for longlasting maximum cleaning performance and anti-microbial functionality.

### Benefits

anti-microbial efficacy of filaments (>99%) demonstrated by an authoritative third party.

### Colors

- 13 standard colors
- Custom colors available

### Diameters

- 0.127mm – 0.305mm  
(5mil – 12mil)

### Bundle Packaging

- Paper spiral wrap
- Plastic spiral wrap
- Plastic sleeve

### Bundle Length

- Full hanks – 1168mm
- Custom cut piece lengths available

### Technology

- Contains Ag+

### Values

- Antimicrobial efficacy (>99%) demonstrated by third parties
- FDA, EU compliant
- EPA rules compliant
- No discoloration observed

FULFILLING CONSUMER NEEDS:



## TYNEX® GALAXY (0900HA)



Offering alternative ways to design toothbrushes that sparkle and have more cleaning power.

### Benefits

The coarse surface with sparkling particles can support whitening claims of toothbrushes and improve plaque removal.

### Product Description

- Filaments that sparkle
- Solid round level filament

### Colors

- 11 standard colors
- Custom colors available

### Diameters

- 0.152mm – 0.254mm  
(6mil – 10mil)

### Bundle Packaging

- Paper spiral wrap
- Plastic spiral wrap
- Plastic sleeve

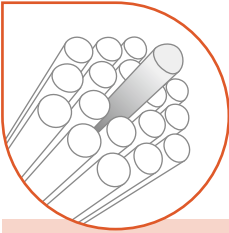
### Bundle Length

- Full hanks – 1168mm
- Custom cut piece lengths available

FULFILLING CONSUMER NEEDS:



## TYNEX® INDICATOR (0915HA/0915RHA)



Reminder for replacement as toothbrush cleaning performance decreases after a period of use.

### Benefits

The color of toothbrush filaments gradually fades or changes over time after brushing.

### Product Description

- Filaments gradually fades or changes
- Solid round level filament

### Colors

- 7 standard colors for color fades
- 10 standard colors for color changes
- Custom colors available

### Diameters

- 0.127mm – 0.356mm (5mil – 14mil)

### Bundle Packaging

- Paper spiral wrap
- Plastic spiral wrap
- Plastic sleeve

### Bundle Length

- Full hanks – 1168mm
- Custom cut piece lengths available

### Technology

- Dyeing scheme: Fading is based on the outward diffusion of the dye inside the filaments
- Double layer scheme: Fading based on wear of the outer material

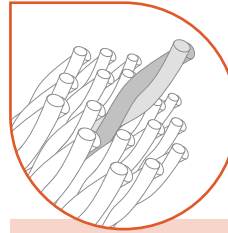
### Values

- FDA, EU compliant
- Consistent quality
- Food grade ingredients to ensure safety
- Reminder for changing toothbrush

### FULFILLING CONSUMER NEEDS:



## TYNEX® SPIRAL (0965HA)



A colored strip twists around filament, bringing visual attraction.

### Benefits

Polygonal cross sections have more cleaning power.

### Product Description

- Solid hexagonal cross section,
- Solid tetragonal cross section

### Colors

- 2 standard colors
- Custom color available

### Diameters

- 0.127mm – 0.203mm (5mil – 8mil)

### Bundle Packaging

- Paper spiral wrap
- Plastic spiral wrap
- Plastic sleeve

### Bundle Length

- Full hanks – 1200mm
- Custom cut piece lengths available

### Technology

- Distributing a second color in a periodic spiral manner in the surface of filament
- Improved stiffness by cross sectional design

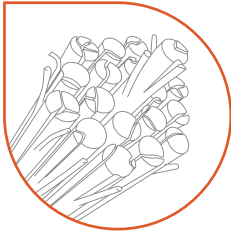
### Values

- FDA, EU compliant
- Consistent quality
- Exquisite appearance
- Improved cleaning

### FULFILLING CONSUMER NEEDS:



## TYNEX® FEATHERED (0943HA)



Crafted with a special design for filament texture, the ends can be “split” to create numerous, multi-fine feathers which provide soft, cushioning tips while retaining normal stiffness at the base. Celanese Tynex® Feathered filaments provide premium comfort and greater interdental penetration for more effective cleaning.

### Benefits

Higher contact surface area for cleaning teeth with more softness.

### Product Description

- Round level filament

### Colors

- 0.127mm – 0.254mm
- (5mil – 10mil)

### Diameters

- 0.152mm – 0.254mm
- (6mil – 10mil)

### Bundle Packaging

- Paper spiral wrap
- Plastic spiral wrap
- Plastic sleeve

### Bundle Length

- Full hanks – 1168mm
- Custom cut piece lengths available

### Technology

- Patented use in toothbrushes (need to check the status of patent)
- Unique cross section
- Filament tips are normally cut by flying knives during the tufting process, but can be split by mechanical impact

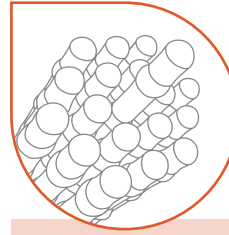
### Values

- FDA, EU compliant
- Multiple production plants for global supply
- Consistent quality
- Multiple tips clean better
- Better inter-dental penetration
- Gentle to gums
- Gingival cleaning

### FULFILLING CONSUMER NEEDS:



## TYNEX® EMBOSSED (0900HH)



The “bumpy” surface may allow for better cleaning. Plus its “glistening” appearance creates a striking display for maximum brand differentiation.

### Benefits

Indentations in the filaments improve toothpaste efficiency.

### Product Description

- Regular pattern along its length
- The pattern consists of tiny indentations
- Textured surface
- Level

### Colors

- 16 standard colors
- Custom colors available

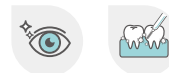
### Diameters

- 0.178mm – 0.254mm
- (7mil – 10mil)

### Bundle Packaging

- Paper spiral wrap
- Plastic spiral wrap
- Plastic sleeve

### FULFILLING CONSUMER NEEDS:



### Bundle Length

- Full hanks – 1168mm
- Custom cut piece lengths available

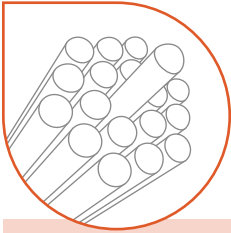
### Technology

- Tiny indentations on one side of the filament and corresponding bumps on the other
- Various shapes available (rectangular, hexagonal, diamond)

### Values

- FDA, EU compliant
- Consistent quality
- Bumpy surface plays to the consumer’s perception of an effective scrubber
- Indentations help carry toothpaste to teeth and gums
- Sparkling appearance

## HEROX® (1100HA)



Basic good quality (nylon 610) toothbrush filament, renewably sourced to support sustainable development

### Benefits

Up to 65% renewable source.

### Product Description

- Solid round level filament

### Colors

- 30 standard colors
- Custom colors available

### Diameters

- 0.127mm – 0.356mm  
(5mil – 14mil)

### Bundle Packaging

- Paper spiral wrap
- Plastic spiral wrap
- Plastic sleeve

### Bundle Length

- Full hanks –  
1200mm x 40mm
- Custom cut lengths  
available

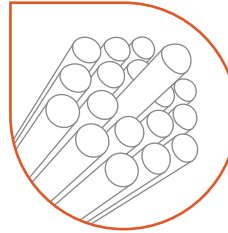
### Technology

- Extrusion process
- Ratio of renewable source  
in raw material – >65%
- Special colors / line  
extension available for  
selected markets

### Values

- FDA/EU compliant
- Consistent quality

## KULEX® LEVEL PBT (1270HA)



PBT based filament

### Colors

- 45 standard colors
- Custom colors available

### Diameters

- 0.102mm – 0.305mm  
(4mil – 12mil)

### Bundle Packaging

- Paper spiral wrap
- Plastic spiral wrap
- Plastic sleeve

### Bundle Length

- Full hanks –  
1200mm x 40mm
- Custom cut lengths  
available

### Option

- Capable for chemical  
tipping capable for adding  
Tea extracts and Neem/-  
Clove extracts (FDA for  
India only)

## KULEX® CT PBT (1860HA)



The filament starts from a <10microns tip and gradually increases in diameter over a length of several millimeters, then levels off.

### Benefits

Taper shaped tip offers a soft touch to gum and deep access to interdental space and under gingival space.

### Product Description

- Solid round filament with taper shaped tip

### Colors

- 45 standard colors
- Custom colors available

### Diameters

- 0.127mm – 0.203mm  
(5mil – 8mil)

### Bundle Packaging

- Cut pieces

### Bundle Length

- Cut piece  
(24mm~33mm)

### Technology

- Shape the tip of filaments with chemical agents.

### Values

- FDA/EU compliant
- Consistent quality
- Better inter-dental penetration
- Gentle to gums
- Gingival cleaning

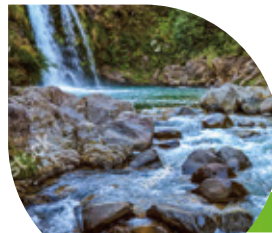
### Options

- Capable for infusing Anti-microbial agent, Charcoal, and Tea/Neem/Clove extractts (FDA for India only).
- Capable for various tip designs, i.e color tipping and two split design.



## SUSTAINABLE SOLUTIONS FOR A BETTER WORLD

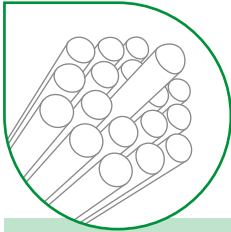
Whether it's advancing safe and sustainable solutions for our customers, investing in our people and communities, helping to preserve the environment, or operating with integrity, Celanese Filaments aims to improve the world and everyday life through the power of chemistry and innovation.



### FULFILLING CONSUMER NEEDS:



## TYNEX® RS (0800HA)



A 100% renewably sourced nylon filament made from castor beans grown naturally in India, China, and Brazil.

### Benefits

- Low density
- Low water absorption rate
- The mechanical properties are little affected by the change in ambient humidity
- Good UV and chemical resistance
- The mechanical properties are comparable to those of PA612

### Product Description

- Solid round level filament

### Bundle Packaging

- Paper spiral wrap
- Plastic spiral wrap

### Colors

- 10 standard colors
- Custom colors available

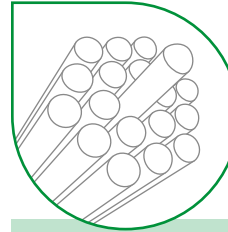
### Bundle Length

- Full hanks – 1168mm
- Custom cut piece lengths  $\geq$  16mm

### Diameters

- 0.127mm – 0.305mm  
(5mil – 12mil)

## KULEX® RS (1400HA)



Kulex® RS is produced from 37% bio-based renewable raw material.

### Benefits

- Kulex®RS not only contains 37% renewable plant-based ingredients, but its production also uses 30% less energy and releases 50% fewer greenhouse gas emissions per pound than the production of nylon 6 does.
- Compared with PBT filaments, Kulex® RS filaments provide better performance.
- Kulex® RS filaments can be mechanically end-rounded, end-tipped, and chemically end-tipped for different applications.

### Product Description

- Solid round level filament

### Bundle Packaging

- Paper spiral wrap
- Plastic spiral wrap

### Colors

- WT152

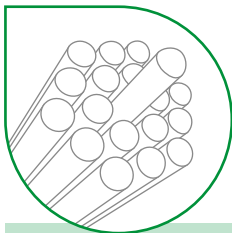
### Bundle Length

- Full hanks – 1168mm
- Custom cut piece lengths available

### Diameters

- 0.127mm – 0.178mm  
(5mil – 7mil)

## Tynex® ECO (0180HA)



A biodegradable and compostable polyester filament, with both the bio-renewable version and the non-bio-renewable version available. The bio-renewable filament is produced with 40% renewable raw materials.

### Benefits

Biodegradability  
Soft touch.

### Product Description

- Solid round level filament

### Bundle Packaging

- Paper spiral wrap
- Plastic spiral wrap

### Colors

- NC410

### Bundle Length

- Full hanks – 1168mm
- Custom cut piece lengths available

### Diameters

- 0.127mm – 0.178mm  
(5mil – 7mil)



## COMMITMENTS TO SUSTAINABILITY AND GLOBAL PARTNERSHIP

Celanese filaments creates value by generating new and practical solutions together with clients and partners in the global network. We believe in inclusive innovation. This means we collaborate with customers, suppliers, governments, academic institutions, and others to develop innovative filament solutions for brushes.

Celanese filaments is always pushing the limits of what is possible, leading the way in technological advancement to fulfill our commitments to the planet. Our worldwide ISO-9001 manufacturing standards ensure manufacturing efficiency and product consistency. With high quality, great performance, and alternative solutions, we aim to contribute to overcoming environmental challenges

with our innovations, and in doing so, develop new business opportunities together with our customers.

Celanese filaments collaborates with stakeholders worldwide to develop innovative solutions. Partnering with Celanese filaments gives you access to more than just technical filament expertise and great filament products, you will also benefit from our knowledge of the brush industry, application know-how, and worldwide resources. This is how we fully support you, our customers.

