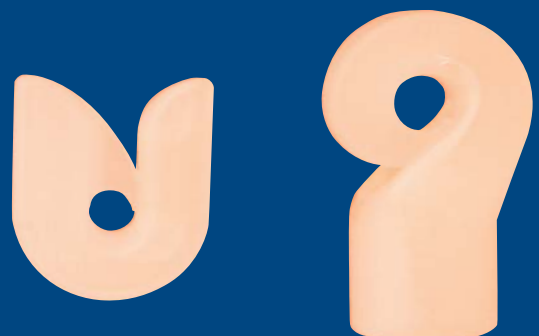


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# Ascotex

*CERAMIC YARN GUIDES*



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CERAMIC YARN GUIDES

FADENFÜHRER AUS OXYDKERAMIK

GUIDE-FILS EN CÉRAMIQUE

GUIA-HILOS EN CERAMICA

GUIA-FIOS EN CERÂMICA

GUIDAFILI IN CERAMICA

## THE NEED FOR CONSTANT DEVELOPMENT OF CERAMIC BODIES FOR YARN GUIDES

The name ASCOTEX has been synonymous with high quality yarn guides for more than 35 years and during this period we have constantly developed new ceramic bodies and different surface finishes to cope with the ever-increasing diversity of modern yarns and working conditions. The most recent addition to our wide range of ceramics specifically developed for textile applications is POLYCRYSTALLINE SAPPHIRE. Although somewhat harder and longer-lasting than A997 alumina, its prime advantage is the perfectly smooth, flawless surface which makes it a superb body for micro and super micro yarns and other fragile and sensitive yarns. The guides already available in this body are marked PCS against the photographs and it is anticipated that a further 20 or 30 will be available soon. Many of the existing tools are suitable for PCS manufacture so if you see an alumina guide in the catalogue which you would like in PCS, please let us know and we shall assess the possibility.

But it is not only the body which is important; SURFACE FINISH is becoming an increasingly significant factor in the choice of the correct guide and the well known convention of matt finish for flat yarn and polish finish for textured yarn no longer necessarily applies in all cases. The type of polish, the type of matt, the grain size and crystalline structure are all important, even the negative or positive surface charge has sometimes to be taken into consideration. The hardest material is not always the best in any given situation and no single body is suitable for all applications. Since our ceramics are developed solely for textile applications, we are in a position to offer a very wide range of alternative solutions.

### OUR MOST POPULAR MATERIALS



**PCS** Polycrystalline Sapphire (99.9999% alumina). Our hardest material but its greatest advantage is its flawless smooth surface. Ideal for micro and supermicro yarns, especially when diamond polished.  
Colour: translucent.



**A997** An ultra high purity  $Al_2O_3$  body, fired at very high temperature, specially developed for very high yarn speeds. Its very fine grain structure eliminates the need for diamond polish in many applications and helps to eliminate snow.  
Colour: light pink or white.



**A964** High purity sintered alumina which, over the years, because of its economical production costs, has become the most popular yarn guide material. Special ceramic additives restrict crystal growth, resulting in an exceptionally fine-grained, smooth-surfaced guide with outstanding wear properties.  
Colour: pink or white.



**A90** A general purpose alumina which is still highly wear-resistant but less expensive than the high purity bodies.  
Colour: red.



**T27B** Titania was one of the first hard ceramics to be used for textile applications. Not quite as hard as alumina, it has however, an extremely smooth surface and is widely used for delicate yarns where alumina, particularly without diamond polishing, is too harsh.  
Colour: cream.



**T27C** Essential for all applications where there is a danger of build up of static electricity and almost universally used on knitting machines.  
Colour: dark blue/black.

**TOLERANCES:**  $\pm 2\%$  none less than  $\pm 0.2\text{mm}$ .

The drawing dimensions are approximate for identification purposes only.

The guides in this catalogue illustrate our standard range and most are normally available from stock. There are another 3000 non-standard items and we can also manufacture guides to your own drawings.



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## DIE NOTWENDIGKEIT DER STETIGEN ENTWICKLUNG VON KERAMIKKÖRPERN FÜR FADENFÜHRER

Der Name Ascotex ist ein Synonym für Fadenführer von höchster Qualität seit über 35 Jahren. Während dieser Zeit haben wir uns der Entwicklung neuer keramischer Körper und Oberflächenbeschaffenheiten gewidmet, um mit der zunehmenden Vielfalt an modernen Fasern und den jeweiligen Bedingungen unter denen diese verarbeitet werden, gerecht zu werden. Unsere neueste Errungenschaft im Bereich der Keramikmaterialien, die speziell für textile Anwendungen entwickelt wurden, ist POLYKRISTALLINER SAPHIR. Obwohl etwas härter und beständiger als A997 Aluminiumoxid, liegt dessen Hauptvorteil in seiner perfekten glatten, fehlerfreien Oberfläche, welche einen exzellenten Körper für Mikro- und Supermikrofasern und auch andere feine Fasern darstellt. Die bereits erhältlichen Fadenführer in diesem Körper sind mit „PCS“ neben den Photos gekennzeichnet. Wir rechnen derzeit mit zusätzlichen 20 oder 30 Fadenführern, die in kürzester Zeit erhältlich sein werden. Viele der bereits existierenden Werkzeuge sind für die PCS Erzeugung geeignet. Sollten Sie also einen Aluminiumoxidfadenführer in unserem Katalog sehen, den sie in PCS möchten, werden wir gerne diese Möglichkeit prüfen.

Aber nicht nur die Form des Fadenführers ist wichtig; auch die OBERFLÄCHENBESCHAFFENHEIT wird zu einem immer wichtigeren Auswahlkriterium für den richtigen Fadenführer, und der altbekannte Einsatz von matter Oberfläche für glatte Garne und geschliffene oder polierte Oberfläche für texturierte Garne ist nicht mehr in allen Fällen angezeigt. Die Art der Polierung, der Typ der matten Oberflächen, die Kornungsgröße sowie die kristalline Struktur sind wichtige Kriterien. Manchmal muß man sogar die negative oder positive Oberflächenspannung in Betracht ziehen. Da unsere Keramikmaterialien ausschließlich für textile Anwendungen entwickelt werden, sind wir in der Lage, eine sehr weitgefächerte Auswahl an alternative Fadenführern anbieten zu können. Das härteste Material ist nicht unbedingt immer die beste Lösung für jede Anwendung und wir können Ihnen eine große Anzahl an Alternativen aus unserer Programm anbieten.

### UNSERE BELIEBTESTEN MATERIALIEN



**PCS** Polykristalliner Saphir (99.9999% Aluminiumoxid). Dies ist unser härtestes Material dessen größter Vorteil in seiner fehlerfreien, glatten Oberfläche liegt. Ideal für Mikro- und Supermikrogarne, besonders wenn die Oberflächenbeschaffenheit diamantpoliert ist. Farbe: durchsichtig.



**A997** Ein ultra hochreiner Aluminiumoxidkörper. Bei sehr hoher Temperatur gebrannt, speziell entwickelt für Hochgeschwindigkeitsgarne. Seine äußerst feine Kornung eliminiert in vielen Anwendungen die Notwendigkeit einer Diamantpolitur und hilft „Schnee“ auszuschalten. Farbe: hellrosa oder weiß.



**A964** Gesintertes Aluminiumoxid von hoher Reinheit. Sehr beliebtes Fadenführermaterial durch günstige Herstellung. Spezielle Keramikzusätze schränken das Kristallwachstum ein. Das Ergebnis ist ein Fadenführer mit einer außergewöhnlich feinen Kornung und glatter Oberfläche mit hervorragender Widerstandsfähigkeit. Farbe: rosa oder weiß.



**A90** Eine Standard Aluminium-Qualität für vielseitigen Einsatz, sehr dauerhaft und preisgünstiger als Teile in hoher Reinheit. Farbe: dunkelrot.



**T27B** Diese Titanoxid-Keramik war eine der ersten Hartkeramiken im Textilbereich. Nicht ganz so hart wie Aluminiumoxid, hat aber eine extrem glatte Oberfläche und wird für empfindliche Garne eingesetzt, für die Aluminiumoxid, besonders ohne Diamantpolierung, zu rau ist. Farbe: cremefarben.



**T27C** Leitendes Titanoxid. Wichtig für alle Anwendungsgebiete in denen die Gefahr der statische Aufladung besteht. Am häufigsten in der Strickmaschinenindustrie verwendet. Farbe: blau/schwarz.

TOLERANZ  $\pm 2\%$  nicht weniger als 0.2mm.

Die Dimensionen der Zeichnungen sind nur ungefähre Annäherungen für die Identifizierung.

Die Fadenführer in diesem Katalog illustrieren unsere Standard Auswahl und sind normalerweise aus unserem Lager erhältlich. Zusätzlich sind noch 3000 andere Stücke erhältlich und wir können auch Fadenführer nach ihren Zeichnungen maßanfertigen.

## LA NÉCESSITÉ D'UN DÉVELOPPEMENT CONSTANT DES MATÉRIAUX CÉRAMIQUES À L'USAGE DE GUIDE-FILS

Le nom ASCOTEX est depuis plus de 35 ans synonyme de guide-fils de haute qualité et durant cette période, nous avons sans cesse développé de nouveaux matériaux céramiques et des finis de surface différents pour répondre à la diversité toujours croissante des fils modernes et des conditions de production. L'addition la plus récente à notre large gamme de céramiques développées spécialement pour les applications textiles est le SAPHIR POLYCRISTALLIN. Bien que légèrement plus dur et plus résistant dans le temps que l'alumine A997, son avantage primordial est sa surface parfaitement lisse et sans défaut, qui en fait un matériau superbe pour les fils composés de microfibres ainsi que pour tous les fils fragiles et délicats. Les guide-fils déjà livrables dans ce matériau sont identifiés par les lettres PCS à côté de l'illustration et il est prévu que 20 à 30 modèles supplémentaires soient livrables prochainement. Un grand nombre des outillages existants sont adaptés pour la fabrication du PCS - de ce fait, si vous voyez dans notre catalogue un guide-fil en alumine que vous souhaiteriez en PCS, veuillez nous le faire savoir et nous examinerons la possibilité.

Mais ce n'est pas seulement le matériau qui est important; le fini de surface devient un élément de plus en plus important dans le choix du guide-fil et la théorie bien connue "surface mate pour fil plat et surface brillante pour fil texturé" n'est plus forcément valable dans tous les cas. Le type de poli, le type de mat, la finesse du grain et la structure cristalline sont tous importants - la charge positive ou négative en surface doit même parfois être prise en considération. Vu que nos céramiques sont développées exclusivement pour les applications textiles, il nous est possible d'offrir une grande variété de solutions alternatives - le matériau le plus dur n'est pas toujours le meilleur pour chaque application et nous pouvons vous offrir un grand nombre d'options parmi notre gamme.

### NOS MATÉRIAUX LES PLUS DEMANDÉS



**PCS** Saphir polycristallin (99.9999% d'alumine). Notre matériau le plus dur, mais son principal avantage est sa surface lisse et sans défaut. Idéal pour les fils en microfibres, spécialement quand il est poli au diamant.  
Couleur: translucide.



**A997** Un matériau en alumine d'extrême pureté. Traitée à très haute température, développée spécialement pour les très grandes vitesses de fil. Sa structure à grain très fine limite le besoin du poli diamant pour beaucoup d'applications et contribue à éliminer la poudre.  
Couleur: rose pâle ou blanc.



**A964** Une alumine de grande pureté qui, au fil des années, grâce à ses coûts de production économiques, est devenue le matériau le plus demandé pour les guide-fils. Des additifs spéciaux limitent la grosseur des cristaux, d'où résulte un guide à grain fin et surface lisse, offrant des propriétés exceptionnelles de résistance à l'usure.  
Couleur: rose ou blanc.



**A90** Une alumine d'usage courant, toujours très résistante à l'usure et moins coûteuse que les matériaux de grande pureté.  
Couleur: rouge foncé.



**T27B** Le titane a été l'une des premières céramiques industrielles utilisées pour les applications textiles. Moins dure que l'alumine, il a cependant une surface extrêmement douce et il est largement utilisé pour les fils délicats pour lesquels, l'alumine, particulièrement non-poli diamant, est trop rugueux.  
Couleur: crème.



**T27C** Titane conducteur. Essentiel pour toutes les applications où il y a un danger d'accumulation d'électricité statique, il est utilisé presque universellement sur les machines à tricoter.  
Couleur: bleu / noir.

**TOLERANCES:  $\pm 2\%$  sans tolérance inférieure à  $\pm 0,2\text{mm}$ .**

Les dimensions des dessins sont approximatives et seulement indicatives.

Les guides de ce catalogue font partie de notre gamme standard et sont normalement livrables de stock. Des milliers d'autres modèles, ainsi que des pièces spéciales sont fabriqués sur demande.

## LA NECESIDAD DEL CONTINUO DESARROLLO TECNOLÓGICO EN GUIA-HILOS DE CERÁMICA

El nombre de ASCOTEX es sinónimo de alta calidad en guía-hilos por más de 35 años y durante este periodo hemos realizado un constante desarrollo de nuevos grupos de cerámicas así como diferentes acabados de superficie para hacer frente al constante incremento en la modernidad de las diversas guía-hilos y nuevas condiciones de trabajo. La más reciente adición a nuestra gama de cerámicas, especialmente creadas para aplicaciones textiles es ZAFIRO POLYCRISTALINO. Aunque algo más dura y duradera que el alumina A997, su principal ventaja es su perfecto pulido y superficie sin defectos que lo hacen un material supremo para hilos micro y super micro y otros hilos frágiles y delicados. Los guía-hilos ya disponibles en este grupo son denominados PCS en las fotografías y está planeado que alrededor de 20 o 30 más lo estarán en poco tiempo. Muchos de los moldes existentes son aptos para producirse en PCS y aunque en el catálogo se presenten las guías en alumina, si se desea en PCS por favor haganoslo saber y estudiaremos las posibilidades para su producción.

Pero no solo el material es importante. El ACABADO DE LA SUPERFICIE ha aumentado significativamente su importancia como factor de elección para los guía-hilos y el convencimiento de que el acabado mate para hilos lisos y el acabado brillante para hilos texturizados no se puede aplicar en todos los casos. El tipo de brillantez, el tipo mate, el tamaño de la fibra y las estructuras cristalinas, así como el nivel de carga positiva o negativa de la superficie deben ser tomadas también en consideración: los materiales más duros no siempre son lo mejor para toda aplicación. Puesto que nuestras cerámicas han sido desarrolladas puramente para aplicaciones textiles, estamos en posición de ofrecer una amplia gama de soluciones alternas en guía-hilos.

### NUESTROS MATERIALES MÁS POPULARES



- PCS Zafiro Polycristalino (99.9999%  $\text{Al}_2\text{O}_3$ ). Nuestro material más duro; sin embargo, su gran ventaja es su superficie sin defectos y muy lisa. Ideal para hilos micro y super micro, especialmente cuando está pulido a diamante.  
Color: traslucido.



- A997 Óxido de alumina de ultra pureza creada para velocidades de hilos muy elevados. Una estructura de granos muy finos ayuda a eliminar la "nieve" y en muchos casos evita la necesidad de pulido a diamante.  
Color: rosado pálido o blanco.



- A964 Una alumina de alta pureza, que, debido a su costo económico de fabricación, es después de muchos años, el material más popular para guía-hilos. Aditivos especiales limitan el crecimiento de cristales, resultando en un grano fino, la superficie lisa y propiedades muy resistentes al desgaste.  
Color: rosa o blanco.



- A90 Una alumina para propósitos generales siendo aún también resistente al desgaste y menos costosa que los materiales de alta pureza.  
Color: vino.



- T27B Óxido de titanio fue uno de las primeras cerámicas duras utilizada para usos textiles. No es tan duro que las aluminas pero con su superficie natural de una finura casi perfecta se utiliza para hilos delicados y en sitios donde la alumina, sobre todo sin pulido a diamante, sería demasiado áspero.  
Color: crema.



- T27C (Conductora). Indispensable en todas las aplicaciones donde exista riesgo de formación de electricidad estática. Uso extenso para el género de punto.  
Color: azul negro.

TOLERANCIAS NORMALES:  $\pm 2\%$  sin ser menor de 0,2mm

Las dimensiones de los dibujos son aproximativas para identificación solamente.

En este catálogo se presentan solo los modelos estándar, de los que en su mayor parte se hallan normalmente en existencia. Hay otros 3000 modelos y también se puede hacer a la medida de sus diseños.

## A NECESSIDADE DE CONSTANTES DESENVOLVIMENTOS DE MATERIAIS CERÂMICOS PARA GUIA-FIOS

O nome ASCOTEX tem sido sinônimo de alta qualidade em guia-fios por mais de 35 anos, e durante esse período temos desenvolvido constantemente novos materiais e diferentes acabamentos superficiais para poder acompanhar a constante evolução dos modernos processos térmicos. A mais recente conquista incorporada a nossa linha de materiais cerâmicos, especialmente desenvolvidos para aplicações térmicas, a SAFIRA POLICRISTALINA. Apesar de ser mais duro e ter uma durabilidade maior do que a Alumina A997, sua principal vantagem é o acabamento superficial, impecável e perfeitamente liso, o que o torna um magnífico material para aplicações com microfibras e outros fios ou fibras extremamente frágeis e sensíveis. Os guias já disponíveis neste material são marcados com a sigla PCS nas fotos do catálogo e antecipamos que mais 20 ou 30 modelos estarão disponíveis em breve. Muitas das ferramentas já existentes são apropriadas à fabricação com PCS, por isso se existir algum interesse em desenvolver alguma peça do catálogo no material PCS, informe-nos para que possamos avaliar a possibilidade.

Porém não somente o material é o único fator importante; o ACABAMENTO SUPERFICIAL está se tornando o fator mais significativo para a escolha do guia-fio mais adequado. A conhecida regra de acabamento acetinado para fios convencionais e acabamento polido para os fios texturizados, não mais se aplica em todos os casos. O tipo de polimento, o tipo de material, a rugosidade, a granulação e a estrutura cristalina são também fatores importantes e até mesmo a carga superficial negativa ou positiva deve ser considerada em muitos casos. Uma vez que nossas cerâmicas são desenvolvidas especificamente para aplicações térmicas, estamos em condições de oferecer uma gama muito ampla de soluções e alternativas de guia-fios. A dureza nem sempre é o melhor parâmetro e nós podemos com certeza, oferecer um grande número de opções dentro da nossa linha de produtos.

### NOSSOS MATERIAIS MAIS CONHECIDOS



**PCS** Safira Policristalina (99.9999% Alumina). Nosso material mais duro, cuja maior vantagem é o acabamento superficial extremamente liso e perfeito. Ideal para microfibras e fios sensíveis e frágeis, especialmente no acabamento polido diamante.  
Cor: translúcido.



**A997** Um material com altíssimo teor de Alumina. Sinterizado em altas temperaturas, desenvolvido especialmente para trabalhar com fios em altas velocidades. Sua finíssima granulometria elimina a necessidade de acabamento polido diamante e auxilia na eliminação da neve.  
Cor: rosa claro e branco.



**A964** Uma Alumina com alta pureza, vem sendo muito utilizada ao longo dos anos devido ao seu econômico custo de produção, tornando-se o material mais popular na fabricação de guia-fios. Aditivos especiais restringem o crescimento dos grãos, resultando uma granulometria fina, superfície lisa, conferindo assim uma excepcional resistência ao desgaste.  
Cor: rosa ou branco.



**A90** Alumina de uso geral, com alta resistência ao desgaste, porém de menor custo em relação à alumina de alta pureza.  
Cor: vinho.



**T27B** Titânia foi o primeiro material cerâmico fino desenvolvido para aplicações térmicas. Não tão duro como a alumina, entretanto possui naturalmente uma superfície extremamente lisa, e em geral é utilizado para fios sensíveis e delicados, particularmente aonde a alumina sem o acabamento polido diamante é muito agressiva.  
Cor: creme.



**T27C** Titânia Condutora. Essencial para todas as aplicações onde existem problemas com eletricidade estática. Quase que mundialmente utilizado em máquinas para malharia.  
Cor: preto azulado.

TOLERÂNCIAS  $\pm 2\%$  e não menos do que 0,2mm.

As dimensões nos desenhos são aproximadas e servem para auxiliar na identificação das peças.

Os guias contidos neste catálogo são os de nossa linha standard e normalmente disponíveis em estoque. Milhares de outros modelos também estão disponíveis sob consulta e novos modelos ou peças especiais podem ser fabricados sob encomenda.



## LA NECESSITA' DI UNO SVILUPPO COSTANTE DEL MATERIALE CERAMICO PER GUIDAFILI TESSILI

Il nome ASCOTEX sinonimo di alta qualità nel campo dei guidafile da oltre 35 anni. Durante questo periodo abbiamo costantemente ricercato e sviluppato nuovi materiali ceramici e varie rifiniture di superficie per far fronte alle sempre nuove tipologie dei filati moderni e delle condizioni di lavorazione. L'ultimo ritrovato in aggiunta alla nostra vasta gamma di ceramiche sviluppato per applicazioni tessili e'lo ZAFFIRO POLYCRISTALLINO. Questo materiale più duro e resistente dell'allumina A997 ha come vantaggio primario una superficie perfettamente liscia e pulita ideale per filati micro e super-micro ed altre fibre sensibili e delicate. I guidafile già disponibili in questo materiale sono segnati 'PCS' sulle fotografie e vi anticipiamo che altri 20/30 particolari saranno presto disponibili. La maggior parte dei nostri stampi ed attrezzature sono adatti per la produzione di 'PCS'. Se desiderate qualche altro guidafile a catalogo realizzato in 'PCS' vogliate comunicarlo e valuteremo la possibilità di produzione.

Importante non soltanto il materiale ceramico ma la rifinitura della superficie che diventa sempre più significativa nella scelta del guidafile corretto e la ben nota convinzione che una superficie opaca per filati piatti e lucida per filati texturizzati non è applicabile per tutte le circostanze. Il tipo e grado di lucidatura e satinatura, la dimensione dei granuli e la struttura cristallina sono tutti fattori importanti, anche la carica negativa e positiva della superficie va in qualche occasione tenuta in considerazione. Poiché le nostre ceramiche sono sviluppate esclusivamente per applicazioni tessili siamo in grado di offrire un'ampia gamma di guidafile alternativi. Il materiale più duro non è sempre il migliore. Per ogni applicazione possiamo offrire parecchie soluzioni adatte alle vostre esigenze di produzione.

### I NOSTRI MATERIALI PIU' IMPIEGATI



**PCS** Zaffiro Polycrystallino (99.9999% allumina). E' il nostro materiale più duro ma la caratteristica più importante è la superficie compatta e liscia. Materiale ideale per Fibre Micro e SuperMicro, in particolare con rifinitura lucidata al diamante.  
Colore: Translucido.



**A997** Materiale in ceramica ad altissimo contenuto di allumina. Cottura ad elevata temperatura sviluppato per produzione di filo ad alta velocità. La struttura dei cristalli molto fine elimina in molte applicazioni il bisogno della lucidatura al diamante e contribuisce ad eliminare l'effetto neve.  
Colori: Rosa Pallido - Bianco.



**A964** Allumina sinterizzata ad alta purezza che è diventata nel tempo, grazie al contenuto costo di produzione il materiale di ceramica più impiegato per guidafile. Speciali additivi ceramici riducono la crescita dei cristalli formando una superficie fine e liscia con alta proprietà di resistenza all'usura.  
Colori: Rosa - Bianco.



**A90** Materiale ceramico per applicazioni diverse, sempre molto resistente all'usura e più economico delle ceramiche ad alto contenuto d'allumina.  
Colore: Rubino.



**T27B** Il Titanio è stato uno dei primi materiali ceramici sviluppati per applicazioni industriali. La durezza inferiore all'Allumina ma con una superficie naturale estremamente liscia ed largamente usato per filati delicati dove l'Allumina specialmente se non lucidata al diamante, è troppo ruvida.  
Colore: Avorio.

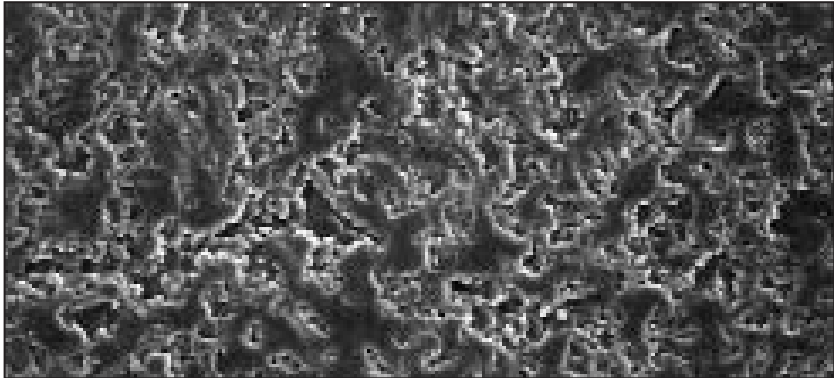


**T27C** Titanio Antistatico. Indispensabile per tutte quelle applicazioni dove esiste la possibilità di accumulo di elettricità statica ed impiegato quasi universalmente per macchine di maglieria.  
Colore: Blue Scuro.

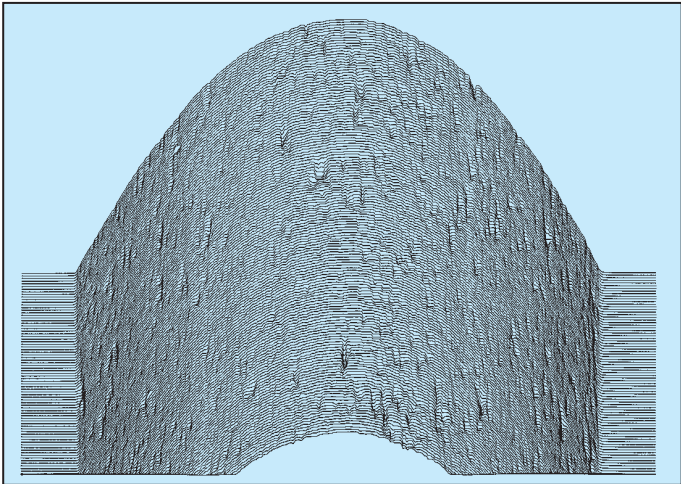
TOLLERANZE  $\pm 2\%$  non meno di 0,2mm.

Le dimensioni dei disegni sono approssimative solamente per identificazione.

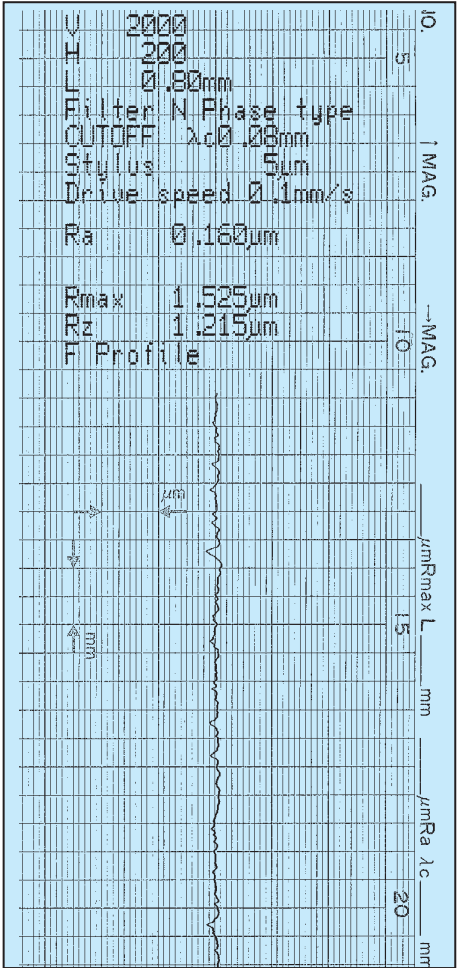
I guidafile contenuti in questo catalogo fanno parte della nostra produzione standard e sono normalmente disponibili a magazzino. Migliaia di altri guidafile ed esecuzioni speciali a disegno si possono produrre su ordinazione.



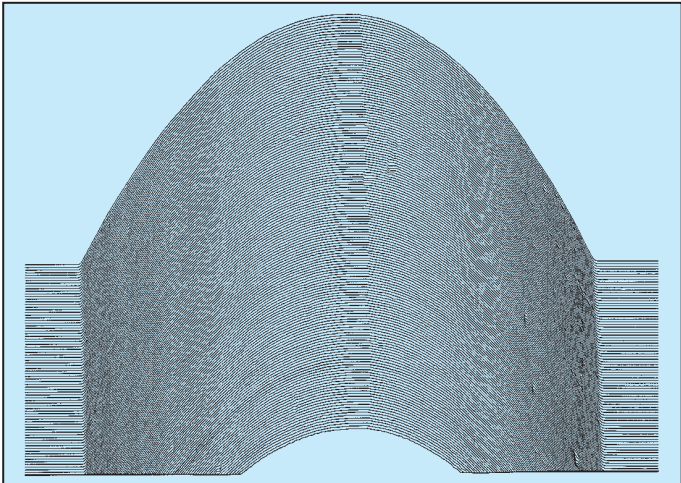
A997 N x1,000



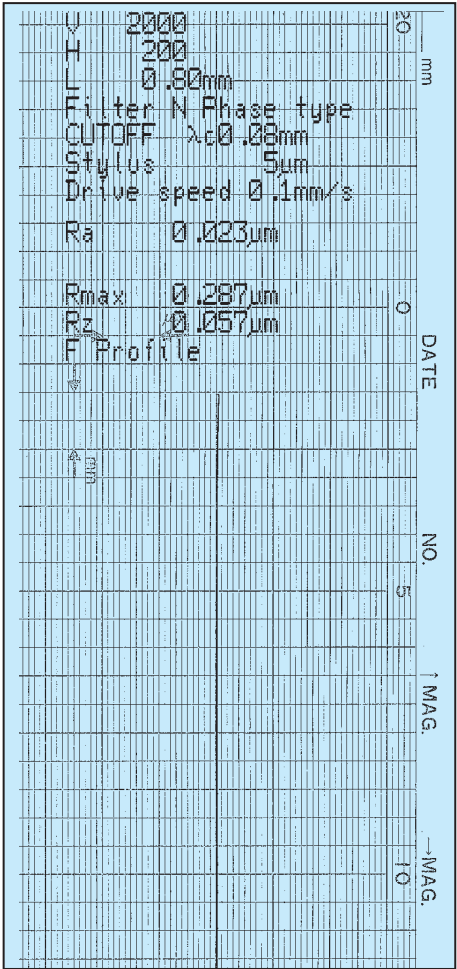
A997 N 3-D profile



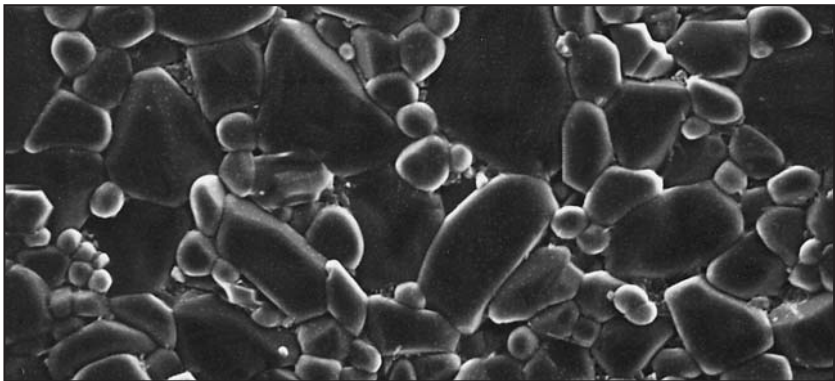
A997 DP x1,000



A997 DP 3-D profile

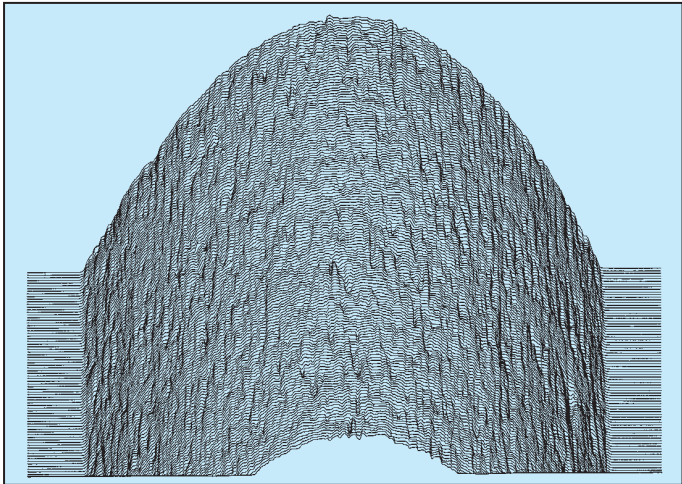






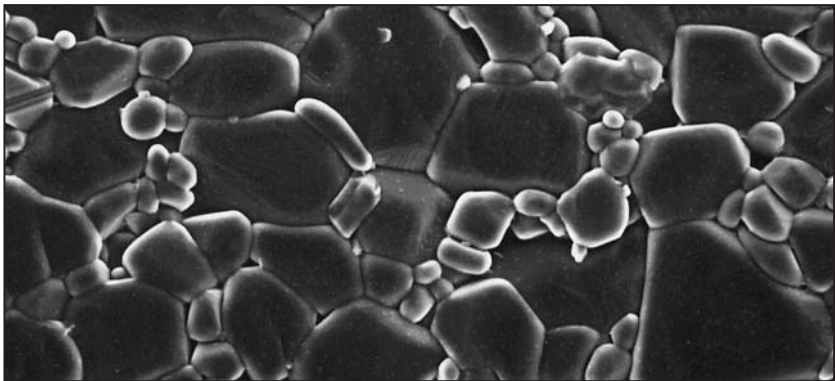
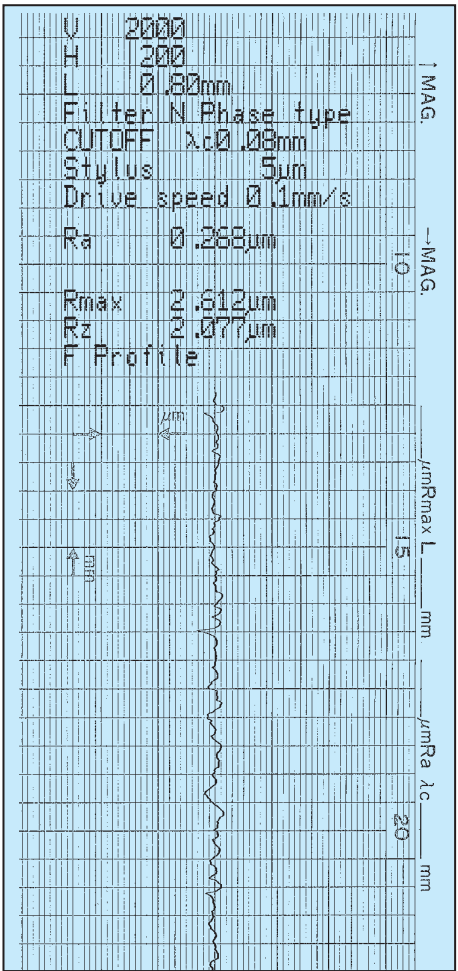
A997 MHF1

x1,000



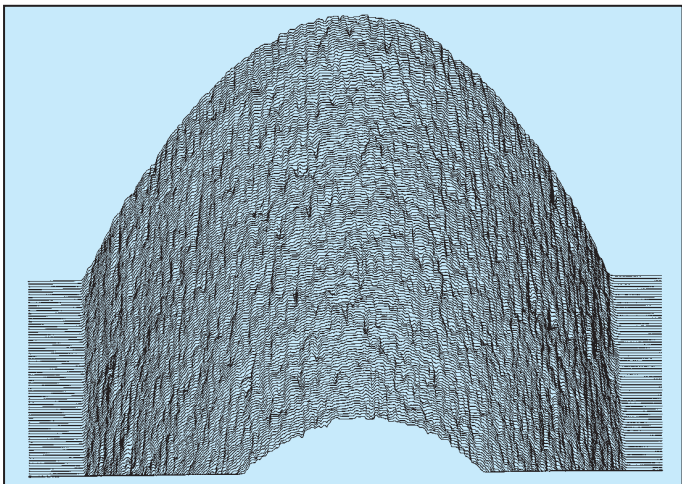
A997 MHF1

3-D profile



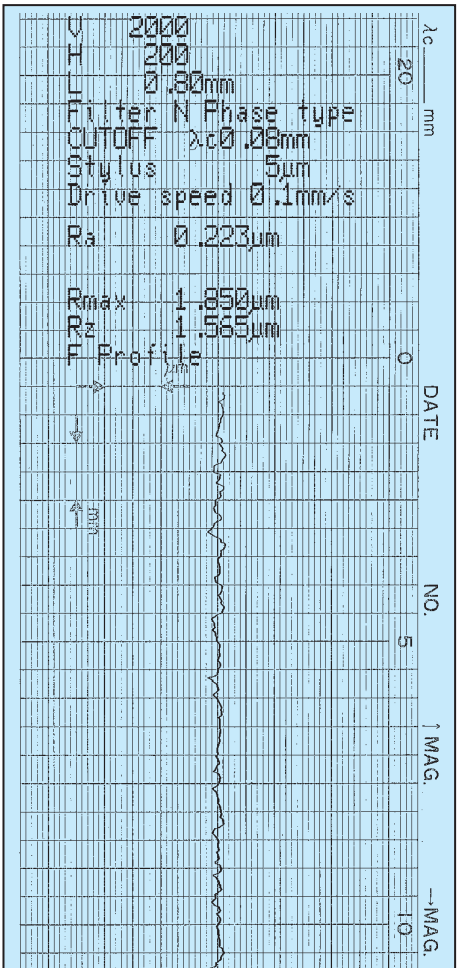
A997 MHF2

x1,000



A997 MHF2

3-D profile



## SURFACE FINISHES

|      |                                                              |                                                                        |
|------|--------------------------------------------------------------|------------------------------------------------------------------------|
| N    | Normal (Velvet/Satin)                                        | Ra & Rt values are influenced by each material.<br>Details on request. |
| DP   | Diamond Polish                                               |                                                                        |
| MM   | Matt (produced by mechanical means)                          |                                                                        |
| MHF1 | Matt (produced by overfiring) A997 only                      |                                                                        |
| MHF2 | Diamond polished in the using area then overfired. A997 only |                                                                        |
| GN   | Centreless grinding on rods and tubes                        |                                                                        |
| GDP  | Centreless grinding on rods and tubes followed by DP         |                                                                        |

## OBERFLÄCHENBESCHAFFENHEIT

|      |                                                                  |                                                                              |
|------|------------------------------------------------------------------|------------------------------------------------------------------------------|
| N    | Normal oder samtartig                                            | Ra & Rt Werte sind bei jedem Material beeinflusst.<br>Details bei Nachfrage. |
| DP   | Diamantpoliert                                                   |                                                                              |
| MM   | Matte Oberfläche (mechanisch erzeugt)                            |                                                                              |
| MHF1 | Matte Oberfläche (erzeugt durch 'overfiring'). Nur bei A997      |                                                                              |
| MHF2 | Diamantpoliert im Fadenlauf und später 'overfired'. Nur bei A997 |                                                                              |
| GN   | Geschliffen an Stäben und Rohren                                 |                                                                              |
| GDP  | Geschliffen an Stäben und Rohren gefolgt von DP                  |                                                                              |

## FINIS DE SURFACE

|      |                                                                                                              |                                                                            |
|------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| N    | Normal (velours/satin)                                                                                       | Les valeurs Ra & Rt dépendent de la matière utilisée. Détails sur demande. |
| DP   | Poli diamant                                                                                                 |                                                                            |
| MM   | Mat (obtenue par procédés mécaniques)                                                                        |                                                                            |
| MHF1 | Mat (produit par traitement à haute température) matière A997 exclusivement                                  |                                                                            |
| MHF2 | Poli diamant sur les surfaces de contacts - ensuite retrait à haute température – matière A997 exclusivement |                                                                            |
| GN   | Rectification sur bâtonnets et tubes                                                                         |                                                                            |
| GDP  | Rectification sur bâtonnets et tubes suivi de poli diamant                                                   |                                                                            |

## ACABADOS DE SUPERFICIE

|      |                                                                               |                                                                          |
|------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| N    | Normal (Terciopelo/Saten)                                                     | Cada material influye los valores Ra y Rt.<br>Detalles sobre peticiones. |
| DP   | Pulido a diamante                                                             |                                                                          |
| MM   | Mate (Producido por medios mecánicos)                                         |                                                                          |
| MHF1 | Mate (Mediante sobrecalentamiento). Solo A997                                 |                                                                          |
| MHF2 | Pulido a diamante en el área de uso: seguido de sobrecalentamiento. Solo A997 |                                                                          |
| GN   | Rectificado en barras y tubos                                                 |                                                                          |
| GDP  | Rectificado en barras y tubos seguido de DP                                   |                                                                          |

## ACABAMENTOS SUPERFICIAIS

|      |                                                                       |                                                                                                 |
|------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| N    | Normal (acetinado)                                                    | Valores de Ra & Rt (rugosidade) dependem de cada material, e podem ser especificados no pedido. |
| DP   | Polido diamante                                                       |                                                                                                 |
| MM   | Mate (produzido por meios mecânicos)                                  |                                                                                                 |
| MHF1 | Mate (produzido por requeima) Somente A997                            |                                                                                                 |
| MHF2 | Polido diamante na área de uso seguido de requeima Somente A997       |                                                                                                 |
| GN   | Rectificado. Normalmente para bastões e tubos                         |                                                                                                 |
| GDP  | Retificado e depois polido diamante. Normalmente para bastões e tubos |                                                                                                 |

## RIFINITURE DI SUPERFICIE

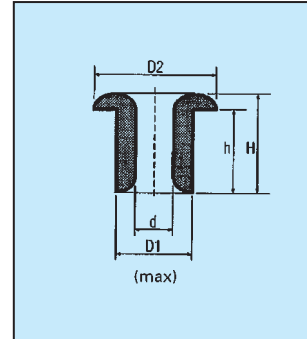
|      |                                                                                       |                                                                                                      |
|------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| N    | Standard (satinata)                                                                   | Ra & Rt - Questi. valori variano a seconda del tipo di materiale ceramico.<br>Dettagli su richiesta. |
| DP   | Lucidata diamante                                                                     |                                                                                                      |
| MM   | Opaca (a macchina)                                                                    |                                                                                                      |
| MHF1 | Opaca (a mezzo ricottura) - solo A997                                                 |                                                                                                      |
| MHF2 | Lucidata diamante nella parte dello scorrimento del filo e quindi ricotta – solo A997 |                                                                                                      |
| GN   | Rettificata per barrette e tubetti                                                    |                                                                                                      |
| GDP  | Rettificata per barrete e tubetti e quindi lucidata diamante                          |                                                                                                      |



# STANDARD EYELETS

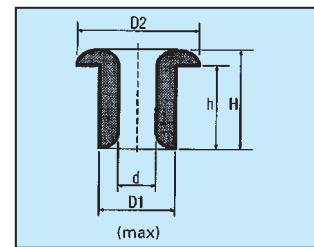
## Flanged Eyelets

(On a minimum quantity of 5000 dimension h can be changed on most eyelets without additional tool cost)



| Ref.No | D1 (max) mm | d mm | H mm  | D2 mm | h mm |
|--------|-------------|------|-------|-------|------|
| FT398  | 2.10        | 1.00 | 7.10  | 2.50  | 6.00 |
| E002   | 2.10        | 1.00 | 3.00  | 3.10  | 2.00 |
| E936   | 2.10        | 1.00 | 5.00  | 3.10  | 4.00 |
| E885   | 2.15        | 1.00 | 2.10  | 3.20  | 1.20 |
| E889S  | 2.60        | 1.40 | 3.00  | 3.80  | 2.00 |
| E889   | 2.60        | 1.40 | 4.00  | 3.80  | 3.00 |
| E136B  | 2.60        | 1.40 | 5.00  | 3.80  | 4.00 |
| FT555  | 2.60        | 1.40 | 6.80  | 3.80  | 5.50 |
| FT555L | 2.60        | 1.40 | 8.30  | 3.80  | 7.00 |
| E886   | 2.90        | 1.10 | 4.20  | 4.90  | 3.00 |
| E952   | 2.90        | 1.50 | 6.50  | 4.80  | 5.00 |
| E913   | 3.00        | 1.40 | 4.00  | 4.90  | 3.00 |
| E972   | 3.00        | 1.50 | 7.50  | 4.80  | 6.00 |
| E915   | 3.10        | 1.60 | 3.10  | 4.20  | 2.00 |
| E001   | 3.10        | 1.70 | 2.00  | 4.20  | 1.00 |
| E862   | 3.10        | 1.60 | 4.20  | 4.30  | 3.00 |
| E971   | 3.30        | 1.60 | 3.20  | 5.50  | 2.40 |
| E940   | 3.30        | 1.60 | 3.30  | 5.60  | 2.50 |
| E951   | 3.30        | 1.70 | 4.75  | 5.70  | 3.50 |
| E881   | 3.80        | 2.00 | 6.60  | 4.80  | 5.00 |
| E176   | 3.85        | 2.00 | 5.25  | 5.50  | 3.20 |
| E266   | 3.90        | 1.40 | 4.55  | 5.50  | 3.00 |
| E868   | 3.90        | 1.90 | 4.00  | 7.00  | 2.50 |
| E035   | 3.90        | 2.20 | 5.25  | 5.50  | 4.25 |
| E948   | 3.95        | 2.00 | 4.20  | 5.50  | 3.00 |
| E328   | 3.95        | 2.10 | 5.35  | 4.95  | 4.25 |
| E839   | 4.00        | 1.90 | 4.30  | 5.55  | 3.00 |
| E897   | 4.00        | 2.00 | 4.60  | 5.80  | 2.50 |
| E923   | 4.10        | 2.70 | 5.00  | 5.00  | 4.00 |
| E269S  | 4.30        | 2.50 | 5.85  | 5.80  | 4.70 |
| E269   | 4.30        | 2.00 | 8.95  | 5.80  | 7.50 |
| E843   | 4.30        | 2.50 | 4.35  | 5.80  | 3.00 |
| E924   | 4.30        | 2.00 | 7.40  | 5.90  | 5.90 |
| E953   | 4.60        | 1.90 | 3.80  | 6.60  | 2.80 |
| E863   | 4.90        | 3.30 | 4.50  | 6.50  | 3.00 |
| E865   | 4.90        | 3.30 | 5.60  | 6.50  | 4.00 |
| E067   | 5.10        | 1.90 | 6.95  | 6.55  | 5.40 |
| E864   | 5.10        | 1.90 | 3.50  | 6.60  | 2.50 |
| E874   | 5.10        | 2.00 | 4.60  | 6.70  | 3.00 |
| E979   | 5.20        | 3.30 | 7.00  | 6.80  | 5.00 |
| E918   | 5.20        | 3.30 | 4.00  | 6.80  | 2.80 |
| E918L  | 5.20        | 3.30 | 5.40  | 7.80  | 4.75 |
| E906   | 5.30        | 2.30 | 4.70  | 7.00  | 3.20 |
| E335   | 5.35        | 3.20 | 5.10  | 7.15  | 4.10 |
| E911   | 5.40        | 3.30 | 5.20  | 7.00  | 4.00 |
| E336   | 5.40        | 3.20 | 6.50  | 8.00  | 5.00 |
| E892   | 5.40        | 3.30 | 7.40  | 7.00  | 6.00 |
| E064   | 5.60        | 2.36 | 4.75  | 7.14  | 3.18 |
| E305   | 5.60        | 4.00 | 4.70  | 7.00  | 3.20 |
| E307   | 5.70        | 3.20 | 6.35  | 7.90  | 5.10 |
| E849   | 5.90        | 2.90 | 5.90  | 7.70  | 4.00 |
| E850   | 5.90        | 2.80 | 7.60  | 7.70  | 5.80 |
| E942S  | 5.95        | 3.40 | 3.00  | 7.75  | 2.00 |
| E166   | 6.00        | 2.85 | 10.00 | 8.00  | 7.75 |
| E825   | 6.00        | 3.00 | 4.70  | 8.15  | 3.00 |

| Ref.No | D1 (max) mm | d mm | H mm  | D2 mm | h mm  |
|--------|-------------|------|-------|-------|-------|
| E919   | 6.00        | 3.40 | 5.00  | 8.00  | 3.00  |
| E942   | 6.00        | 3.40 | 6.00  | 7.80  | 4.00  |
| E120   | 6.00        | 3.20 | 8.00  | 7.90  | 6.20  |
| E980   | 6.00        | 4.00 | 5.00  | 9.00  | 3.00  |
| E961   | 6.00        | 3.50 | 5.00  | 8.00  | 3.00  |
| E941L  | 6.00        | 3.40 | 8.00  | 8.00  | 6.50  |
| E914   | 6.10        | 3.30 | 3.50  | 7.50  | 2.00  |
| E039   | 6.10        | 3.50 | 4.50  | 7.50  | 3.50  |
| E004B  | 6.10        | 3.40 | 5.70  | 8.00  | 3.75  |
| E941   | 6.10        | 3.40 | 6.50  | 7.80  | 5.00  |
| E171   | 6.20        | 4.00 | 8.00  | 8.50  | 6.50  |
| E963   | 6.20        | 4.00 | 10.00 | 10.25 | 7.80  |
| E004D  | 6.25        | 2.80 | 5.80  | 7.90  | 4.00  |
| E856   | 6.30        | 3.30 | 2.80  | 8.00  | 1.80  |
| E857   | 6.40        | 3.50 | 3.50  | 7.90  | 2.50  |
| E888   | 6.40        | 3.50 | 4.50  | 8.00  | 3.50  |
| E870   | 6.40        | 3.90 | 8.00  | 8.70  | 6.40  |
| E964   | 6.40        | 3.00 | 4.70  | 10.70 | 3.00  |
| E329L  | 6.45        | 4.00 | 8.60  | 8.70  | 6.50  |
| E177   | 6.45        | 3.00 | 10.36 | 10.60 | 8.40  |
| E329S  | 6.50        | 4.00 | 4.60  | 8.70  | 3.00  |
| E329   | 6.50        | 4.00 | 6.50  | 8.70  | 5.00  |
| E848   | 6.70        | 3.80 | 7.50  | 8.80  | 6.00  |
| E869   | 6.80        | 3.80 | 7.40  | 8.80  | 6.00  |
| E815   | 7.00        | 4.50 | 8.00  | 9.00  | 6.80  |
| E066   | 7.00        | 4.00 | 9.80  | 10.00 | 8.00  |
| E965   | 7.00        | 4.00 | 11.80 | 10.00 | 10.00 |
| E854   | 7.10        | 4.50 | 7.00  | 9.20  | 5.30  |
| E937   | 7.10        | 2.70 | 4.50  | 9.20  | 2.80  |
| E835   | 7.20        | 4.60 | 7.70  | 9.90  | 6.00  |
| E958   | 7.15        | 3.80 | 7.10  | 9.20  | 5.30  |
| E927   | 7.35        | 3.80 | 9.00  | 9.70  | 7.00  |
| E982   | 7.35        | 4.80 | 3.00  | 10.00 | 1.50  |
| E983   | 7.35        | 4.80 | 5.50  | 10.00 | 4.00  |
| E921   | 7.40        | 3.50 | 11.00 | 9.00  | 9.00  |
| E308   | 7.40        | 3.90 | 9.00  | 9.50  | 7.00  |
| E308S  | 7.40        | 3.90 | 7.40  | 9.50  | 5.50  |
| E070   | 7.50        | 3.25 | 7.14  | 9.90  | 5.10  |
| E939   | 7.50        | 3.90 | 8.00  | 9.50  | 6.00  |
| E954   | 7.50        | 5.50 | 9.00  | 9.60  | 6.80  |
| E330   | 7.50        | 3.80 | 6.60  | 10.00 | 4.80  |
| E330L  | 7.50        | 4.40 | 7.40  | 10.00 | 5.30  |
| E038   | 7.60        | 4.50 | 7.00  | 9.50  | 5.00  |
| E381   | 7.60        | 4.50 | 11.00 | 9.50  | 9.00  |
| E950   | 7.60        | 5.50 | 15.85 | 9.50  | 13.30 |
| E956   | 7.60        | 5.50 | 13.50 | 9.50  | 11.50 |
| E823   | 7.70        | 4.90 | 3.00  | 8.45  | 2.00  |
| E823L  | 7.70        | 4.90 | 3.70  | 10.70 | 2.00  |
| E928   | 7.70        | 4.70 | 8.70  | 10.60 | 7.00  |
| E341   | 7.70        | 4.75 | 5.55  | 10.80 | 3.65  |
| E866S  | 8.10        | 4.10 | 6.40  | 10.00 | 4.40  |
| E866   | 8.10        | 4.10 | 8.30  | 10.00 | 6.40  |
| E946   | 8.10        | 6.00 | 5.00  | 11.00 | 3.00  |
| E967   | 8.10        | 3.00 | 16.50 | 9.40  | 15.00 |
| E946S  | 8.20        | 6.00 | 3.60  | 11.00 | 1.50  |

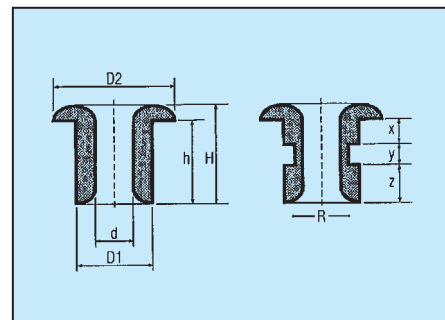


## Flanged Eyelets

| Ref.No | D1<br>(max)<br>mm | d<br>mm | H<br>mm | D2<br>mm | h<br>mm |
|--------|-------------------|---------|---------|----------|---------|
| E832   | 8.60              | 4.20    | 7.00    | 9.90     | 5.40    |
| E829   | 8.70              | 4.80    | 5.00    | 10.70    | 3.50    |
| E859   | 8.70              | 4.60    | 13.90   | 10.75    | 11.80   |
| E241   | 8.70              | 4.75    | 7.90    | 10.00    | 5.90    |
| E241L  | 8.70              | 4.75    | 10.00   | 10.70    | 8.00    |
| E109B  | 8.80              | 5.30    | 13.20   | 12.90    | 11.30   |
| E926   | 8.90              | 4.70    | 10.20   | 10.60    | 8.30    |
| E103   | 8.90              | 5.30    | 16.00   | 12.90    | 14.00   |
| E321   | 8.90              | 5.00    | 20.00   | 10.60    | 17.00   |
| E108   | 9.00              | 4.75    | 13.00   | 10.70    | 11.00   |
| E901   | 9.10              | 4.00    | 7.00    | 13.00    | 5.00    |
| E109D  | 9.15              | 5.00    | 12.70   | 11.00    | 10.55   |
| E049   | 9.20              | 5.30    | 8.60    | 11.50    | 6.85    |
| E955   | 9.50              | 6.20    | 7.90    | 12.00    | 5.50    |
| E830   | 9.55              | 6.20    | 6.65    | 12.00    | 4.00    |
| E943   | 9.60              | 4.70    | 9.50    | 12.70    | 6.30    |
| E968   | 9.60              | 5.50    | 8.20    | 11.70    | 6.00    |
| E975   | 9.60              | 6.60    | 7.80    | 13.20    | 1.80    |
| E876   | 9.60              | 2.00    | 8.00    | 12.70    | 5.40    |
| E828   | 9.70              | 6.20    | 9.00    | 12.00    | 7.00    |
| E063   | 9.70              | 6.20    | 4.70    | 12.00    | 2.50    |
| E062   | 9.70              | 6.20    | 10.50   | 12.00    | 8.35    |
| E973   | 9.90              | 4.70    | 7.10    | 12.85    | 4.60    |
| E934   | 9.90              | 5.30    | 25.00   | 14.70    | 22.00   |
| E878   | 9.95              | 6.10    | 4.40    | 11.90    | 2.80    |
| E959   | 10.00             | 6.00    | 12.80   | 12.00    | 8.80    |
| E879L  | 10.00             | 6.10    | 8.50    | 11.90    | 7.00    |
| E879   | 10.00             | 6.10    | 4.40    | 11.90    | 2.75    |
| E978   | 10.00             | 6.30    | 15.60   | 13.50    | 11.00   |
| E384   | 10.00             | 4.00    | 15.00   | 12.00    | 11.00   |
| E385   | 10.00             | 5.00    | 15.00   | 12.00    | 11.00   |
| E386   | 10.00             | 6.00    | 15.00   | 12.00    | 11.00   |
| E900   | 10.00             | 7.00    | 11.00   | 12.10    | 9.00    |
| E900L  | 10.00             | 7.00    | 12.50   | 12.10    | 9.00    |
| E042   | 10.00             | 7.00    | 6.00    | 12.10    | 4.00    |

| Ref.No | D1<br>(max)<br>mm | d<br>mm | H<br>mm | D2<br>mm | h<br>mm |
|--------|-------------------|---------|---------|----------|---------|
| E935   | 10.10             | 7.00    | 5.00    | 12.10    | 3.00    |
| E212   | 10.10             | 5.00    | 8.60    | 12.00    | 6.40    |
| E875   | 10.50             | 7.90    | 8.00    | 12.85    | 4.00    |
| E970   | 11.00             | 6.50    | 9.25    | 14.00    | 6.75    |
| E969   | 11.00             | 6.50    | 12.70   | 14.00    | 10.20   |
| E909   | 11.05             | 7.50    | 6.60    | 14.00    | 5.00    |
| E910   | 11.45             | 7.00    | 9.10    | 14.00    | 7.00    |
| E050   | 11.80             | 7.60    | 10.00   | 15.40    | 7.50    |
| E377   | 11.95             | 7.60    | 10.20   | 15.45    | 7.20    |
| E301B  | 12.00             | 7.60    | 7.00    | 15.40    | 4.00    |
| E949   | 12.00             | 7.50    | 8.50    | 15.50    | 6.25    |
| E962   | 12.40             | 8.75    | 9.00    | 16.00    | 7.00    |
| E378   | 12.40             | 8.75    | 10.30   | 16.00    | 7.00    |
| E144   | 12.55             | 6.80    | 9.80    | 15.80    | 6.30    |
| E143   | 12.65             | 8.75    | 10.30   | 15.90    | 7.15    |
| E895   | 12.75             | 4.50    | 7.00    | 15.70    | 4.00    |
| E896   | 12.95             | 8.75    | 10.10   | 18.20    | 8.00    |
| E041   | 14.15             | 10.00   | 6.00    | 16.00    | 4.00    |
| E041L  | 14.15             | 10.00   | 9.60    | 16.00    | 7.50    |
| E820   | 15.45             | 10.00   | 8.40    | 19.50    | 5.40    |
| E922   | 15.45             | 9.60    | 17.00   | 19.50    | 14.00   |
| E840   | 15.45             | 9.70    | 13.50   | 19.75    | 10.00   |
| E842   | 18.55             | 12.00   | 13.60   | 22.00    | 10.00   |
| E836   | 19.80             | 13.90   | 12.50   | 25.70    | 9.10    |
| E871   | 22.25             | 16.00   | 11.00   | 28.30    | 7.00    |
| E871L  | 22.25             | 16.00   | 14.00   | 28.30    | 10.00   |
| E847   | 22.25             | 13.00   | 14.00   | 28.20    | 9.00    |
| E960   | 24.25             | 19.00   | 11.00   | 30.00    | 7.00    |
| E925   | 25.85             | 20.00   | 8.00    | 31.50    | 6.00    |
| E861   | 30.10             | 20.00   | 25.00   | 35.00    | 20.00   |
| E861S  | 30.10             | 20.20   | 10.00   | 35.00    | 5.00    |
| E891   | 35.35             | 24.00   | 11.00   | 38.00    | 8.00    |
| E966C  | 40.00             | 30.00   | 10.00   | 44.00    | 6.80    |
| E938   | 41.80             | 33.00   | 10.80   | 47.50    | 6.80    |

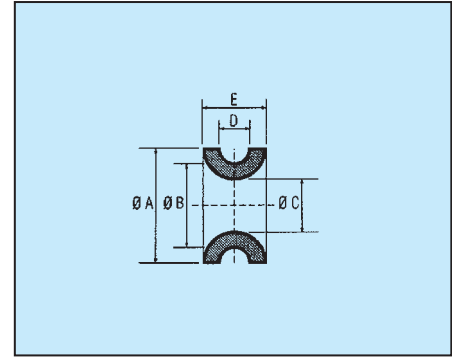
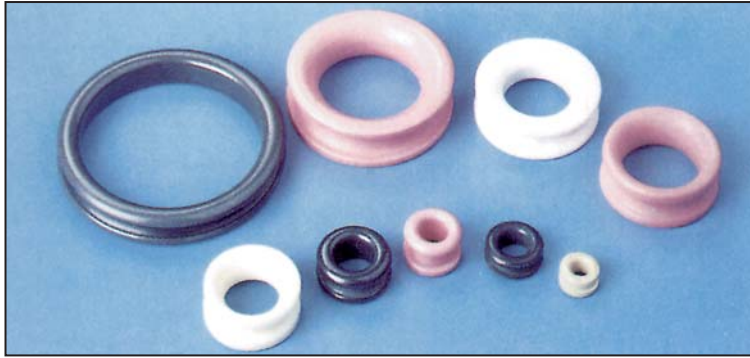
## Grooved Eyelets



| Ref.No | D1<br>(max)<br>mm | d<br>mm | H<br>mm | D2<br>mm | h<br>mm | x<br>mm | y<br>mm | z<br>mm | R<br>mm |
|--------|-------------------|---------|---------|----------|---------|---------|---------|---------|---------|
| E430   | 4.45              | 1.50    | 4.80    | 5.80     | 3.45    | 1.55    | 0.80    | 1.10    | 3.60    |
| E474   | 4.60              | 2.00    | 4.80    | 5.80     | 3.70    | 1.90    | 0.80    | 1.00    | 3.80    |
| E487   | 5.90              | 3.00    | 7.00    | 8.30     | 5.00    | 1.00    | 1.30    | 2.70    | 4.50    |
| E422   | 6.10              | 3.10    | 5.00    | 7.50     | 3.80    | 1.40    | 1.00    | 1.40    | 5.20    |
| E445   | 6.20              | 3.00    | 10.50   | 8.00     | 7.00    | 4.00    | 1.00    | 2.00    | 5.40    |
| E472   | 6.30              | 3.00    | 5.80    | 7.90     | 4.00    | 1.60    | 1.00    | 1.40    | 5.20    |
| E494   | 6.60              | 3.80    | 5.80    | 8.70     | 3.95    | 1.40    | 0.75    | 1.80    | 5.60    |
| E453   | 6.70              | 3.70    | 9.70    | 8.70     | 7.80    | 5.00    | 1.20    | 1.60    | 5.60    |
| E458   | 7.40              | 4.10    | 8.00    | 10.40    | 6.30    | 3.20    | 1.30    | 1.80    | 6.00    |
| E473   | 7.40              | 3.40    | 10.60   | 8.80     | 8.40    | 5.90    | 1.10    | 1.40    | 5.90    |
| E467   | 7.60              | 3.50    | 7.10    | 9.00     | 5.00    | 1.85    | 1.10    | 2.15    | 6.50    |
| E408   | 7.80              | 4.00    | 7.50    | 9.90     | 5.80    | 3.00    | 1.20    | 1.60    | 6.80    |
| E493   | 7.80              | 4.00    | 8.20    | 9.40     | 6.70    | 3.50    | 1.10    | 2.10    | 6.60    |
| E431   | 8.00              | 3.90    | 10.50   | 10.00    | 8.30    | 4.80    | 1.00    | 2.50    | 7.00    |
| E424   | 8.00              | 4.50    | 4.70    | 10.00    | 3.30    | 1.20    | 1.00    | 1.10    | 7.00    |
| E451   | 8.00              | 3.80    | 6.40    | 9.70     | 4.90    | 1.90    | 1.10    | 1.90    | 7.10    |
| E420A  | 8.00              | 1.20    | 8.50    | 9.60     | 6.70    | 3.70    | 1.00    | 2.00    | 7.00    |

| Ref.No | D1<br>(max)<br>mm | d<br>mm | H<br>mm | D2<br>mm | h<br>mm | x<br>mm | y<br>mm | z<br>mm | R<br>mm |
|--------|-------------------|---------|---------|----------|---------|---------|---------|---------|---------|
| E420B  | 8.00              | 1.50    | 8.50    | 9.60     | 6.70    | 3.70    | 1.00    | 2.00    | 7.00    |
| E420C  | 8.00              | 3.60    | 8.50    | 9.60     | 6.70    | 3.70    | 1.00    | 2.00    | 7.00    |
| E483   | 8.50              | 4.10    | 7.20    | 10.00    | 5.40    | 2.50    | 1.00    | 1.90    | 7.00    |
| E446   | 8.50              | 4.20    | 7.00    | 10.00    | 5.50    | 2.80    | 1.00    | 1.70    | 6.90    |
| E441   | 8.80              | 4.50    | 7.20    | 10.00    | 6.00    | 3.00    | 1.00    | 2.00    | 7.70    |
| E433   | 9.50              | 6.20    | 9.10    | 12.00    | 6.60    | 3.40    | 1.50    | 1.70    | 8.00    |
| E434   | 9.60              | 6.30    | 10.70   | 12.20    | 8.50    | 4.90    | 1.40    | 2.20    | 8.00    |
| E432   | 9.90              | 6.60    | 8.00    | 13.00    | 6.00    | 3.20    | 1.30    | 1.50    | 8.50    |
| E466   | 9.90              | 4.70    | 7.10    | 12.90    | 4.65    | 2.15    | 1.10    | 1.40    | 8.60    |
| E435   | 11.90             | 7.60    | 10.20   | 15.60    | 7.00    | 3.00    | 2.00    | 2.00    | 10.00   |
| E429   | 12.00             | 8.00    | 11.50   | 15.30    | 8.60    | 5.00    | 1.00    | 2.60    | 10.40   |
| E425   | 12.70             | 4.80    | 10.80   | 15.90    | 7.60    | 3.00    | 2.45    | 2.15    | 10.30   |
| E402   | 12.90             | 8.70    | 10.30   | 16.00    | 8.00    | 4.20    | 1.80    | 2.00    | 11.20   |
| E427   | 13.70             | 4.20    | 15.30   | 38.60    | 9.90    | 7.00    | 1.50    | 1.40    | 12.00   |
| E421   | 15.00             | 9.80    | 9.50    | 20.50    | 6.15    | 2.80    | 1.20    | 2.15    | 13.40   |
| E410   | 18.60             | 12.00   | 16.70   | 22.00    | 13.05   | 9.80    | 1.25    | 2.00    | 16.50   |

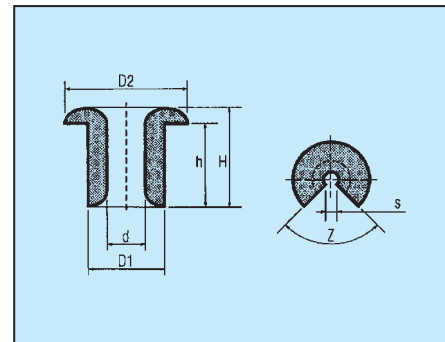
## Double Flanged Eyelets



| Ref.No | A mm | B mm | C mm | D mm | E mm |
|--------|------|------|------|------|------|
| DF46   | 4.30 | 3.40 | 2.60 | 1.00 | 2.60 |
| DF29   | 5.10 | 3.50 | 1.90 | 2.50 | 4.90 |
| DF1    | 5.50 | 4.30 | 2.50 | 1.00 | 3.20 |
| DF32   | 5.50 | 4.50 | 3.30 | 1.10 | 2.50 |
| DF2    | 7.00 | 5.00 | 3.00 | 1.00 | 3.50 |
| DF35   | 7.50 | 6.00 | 3.60 | 3.40 | 6.40 |
| DF4    | 8.00 | 6.20 | 3.00 | 1.20 | 4.00 |
| DF20   | 8.00 | 6.20 | 3.30 | 1.60 | 4.10 |
| DF14   | 8.00 | 6.10 | 3.10 | 1.60 | 4.80 |
| DF16   | 8.00 | 6.50 | 3.10 | 0.90 | 4.00 |
| DF15   | 8.10 | 5.60 | 3.40 | 1.60 | 6.50 |
| DF5    | 8.20 | 6.00 | 4.00 | 1.40 | 3.40 |
| DF6    | 8.20 | 6.10 | 4.00 | 2.70 | 5.60 |
| DF17   | 8.20 | 7.00 | 4.30 | 4.30 | 7.00 |
| DF36   | 8.50 | 6.00 | 4.00 | 2.00 | 5.40 |

| Ref.No | A mm  | B mm  | C mm  | D mm | E mm  |
|--------|-------|-------|-------|------|-------|
| DF7    | 8.50  | 7.40  | 3.10  | 2.70 | 5.80  |
| DF33   | 8.60  | 7.50  | 3.10  | 3.20 | 6.50  |
| DF8    | 9.10  | 6.80  | 4.80  | 1.20 | 4.00  |
| DF22   | 9.10  | 6.10  | 3.30  | 2.60 | 6.50  |
| DF13   | 10.30 | 7.00  | 4.80  | 2.50 | 5.30  |
| DF9    | 10.40 | 9.10  | 5.00  | 0.90 | 4.00  |
| DF18   | 11.10 | 9.30  | 5.00  | 0.80 | 4.50  |
| DF12   | 11.90 | 9.00  | 6.00  | 2.00 | 6.20  |
| DF21   | 13.00 | 10.00 | 6.50  | 6.50 | 12.00 |
| DF28   | 13.25 | 10.60 | 7.25  | 2.50 | 6.00  |
| DF25   | 15.00 | 11.50 | 7.90  | 1.50 | 5.50  |
| DF47   | 15.00 | 11.50 | 7.80  | 2.50 | 7.00  |
| DF26   | 18.50 | 15.00 | 10.00 | 3.00 | 6.00  |
| DF37   | 20.00 | 11.50 | 6.00  | 3.60 | 9.00  |
| DF11   | 24.50 | 20.50 | 14.60 | 3.50 | 7.20  |
| DF38   | 28.50 | 20.80 | 14.30 | 6.30 | 13.50 |
| DF27   | 33.20 | 31.00 | 26.10 | 2.00 | 5.30  |

## Split Eyelets

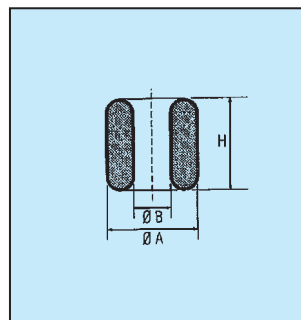


| Ref.No | D1 (max) mm | d mm | H mm | D2 mm | h mm | s mm | z mm |
|--------|-------------|------|------|-------|------|------|------|
| E628   | 3.60        | 2.00 | 4.20 | 5.30  | 3.00 | 0.80 | 2.40 |
| E627B  | 3.90        | 1.60 | 4.20 | 5.20  | 3.00 | 0.80 | 2.00 |
| E651   | 6.00        | 3.00 | 2.00 | 10.00 | 1.00 | 1.20 | 5.00 |
| E624   | 6.10        | 3.00 | 4.25 | 8.00  | 3.00 | 1.50 | 1.50 |
| E653   | 6.60        | 3.00 | 7.60 | 7.80  | 6.40 | 2.60 | 2.60 |
| E639   | 6.80        | 3.80 | 3.00 | 9.00  | 1.40 | 1.70 | 3.00 |
| E637   | 6.90        | 3.80 | 6.50 | 9.00  | 5.00 | 1.70 | 3.00 |
| E638   | 7.10        | 1.50 | 5.00 | 9.00  | 3.20 | 1.00 | 5.40 |
| E617   | 7.40        | 3.80 | 8.00 | 9.60  | 6.50 | 1.00 | 3.00 |
| E650   | 7.40        | 3.20 | 4.50 | 9.90  | 2.60 | 1.50 | 4.00 |
| E626   | 7.50        | 5.00 | 5.00 | 10.00 | 3.00 | 2.00 | 2.50 |
| E629   | 7.70        | 4.70 | 4.20 | 9.00  | 3.00 | 4.25 | 4.25 |
| E642   | 7.80        | 3.10 | 9.80 | 10.20 | 7.20 | 0.90 | 2.50 |
| E619B  | 8.10        | 3.20 | 5.50 | 10.50 | 3.50 | 1.00 | 4.50 |

| Ref.No  | D1 (max) mm | d mm  | H mm  | D2 mm | h mm  | s mm | z mm |
|---------|-------------|-------|-------|-------|-------|------|------|
| E619CG* | 8.10        | 3.20  | 5.50  | 10.30 | 3.50  | 1.00 | 4.50 |
| E623B   | 9.10        | 4.90  | 4.70  | 11.00 | 3.00  | 2.00 | 2.00 |
| E623/90 | 9.10        | 5.00  | 4.50  | 11.00 | 3.00  | 2.00 | 6.50 |
| E622    | 9.70        | 4.75  | 9.80  | 12.70 | 7.10  | 3.30 | 3.30 |
| E656    | 9.80        | 5.40  | 5.80  | 14.30 | 3.50  | 1.40 | 5.00 |
| E625B   | 10.10       | 6.00  | 4.50  | 12.00 | 3.00  | 2.30 | 2.30 |
| E634    | 10.10       | 4.10  | 8.10  | 12.00 | 7.00  | 2.00 | 5.00 |
| E655    | 10.10       | 4.10  | 5.50  | 12.00 | 3.60  | 2.00 | 6.00 |
| E601    | 12.40       | 7.60  | 7.00  | 15.90 | 4.00  | 2.50 | 8.50 |
| E620    | 13.30       | 4.70  | 12.00 | 17.20 | 9.50  | 1.50 | 7.00 |
| E659    | 13.50       | 4.20  | 12.00 | 15.50 | 8.80  | 2.40 | 2.40 |
| E603    | 14.40       | 11.00 | 6.00  | 17.40 | 3.00  | 9.00 | 9.00 |
| E660    | 15.50       | 9.80  | 13.40 | 19.50 | 9.80  | 2.60 | 2.60 |
| E602    | 19.00       | 9.00  | 27.80 | 28.00 | 21.00 | 5.00 | 5.00 |

\*with clip groove

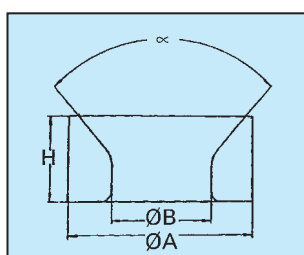
## Tube Eyelets



| Ref.No | A<br>mm | B<br>mm | H<br>mm |
|--------|---------|---------|---------|
| TE1    | 4.45    | 2.00    | 4.60    |
| TE2    | 5.00    | 2.50    | 6.00    |
| TE48   | 5.00    | 3.00    | 5.00    |
| TE3    | 6.00    | 3.50    | 6.00    |
| TE49   | 6.00    | 3.00    | 2.60    |
| TE4    | 6.00    | 3.00    | 8.00    |
| TE52   | 6.80    | 4.00    | 2.00    |
| TE13   | 7.00    | 3.00    | 5.00    |
| TE5    | 7.50    | 4.00    | 4.00    |
| TE39   | 7.50    | 4.00    | 12.00   |
| TE6    | 8.00    | 3.50    | 10.00   |
| TE25   | 8.00    | 4.20    | 2.00    |
| TE14   | 8.50    | 6.00    | 4.50    |
| TE16   | 8.50    | 5.50    | 10.00   |

| Ref.No | A<br>mm | B<br>mm | H<br>mm |
|--------|---------|---------|---------|
| TE7    | 9.60    | 7.00    | 7.80    |
| TE21   | 9.00    | 4.00    | 18.00   |
| TE8    | 10.00   | 5.50    | 6.00    |
| TE10   | 10.00   | 7.00    | 8.00    |
| TE40   | 10.80   | 6.00    | 14.00   |
| TE43   | 11.60   | 6.80    | 12.00   |
| TE37   | 12.00   | 7.00    | 3.00    |
| TE11   | 12.00   | 7.00    | 8.00    |
| TE41   | 12.20   | 9.00    | 13.00   |
| TE44   | 12.20   | 6.70    | 15.00   |
| TE15   | 13.00   | 9.50    | 4.00    |
| TE23   | 15.20   | 9.70    | 10.40   |
| TE38   | 18.00   | 9.00    | 20.00   |
| TE17   | 23.00   | 14.50   | 17.50   |

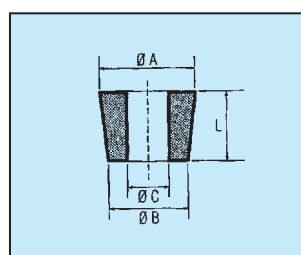
## Ball/Spindle Eyelets



| Ref.No | A<br>mm | B<br>mm | H<br>mm | a         |
|--------|---------|---------|---------|-----------|
| TE18   | 10.60   | 3.00    | 5.00    | 120°      |
| TE12   | 11.00   | 4.00    | 4.50    | 120°      |
| TE24   | 12.90   | 4.50    | 5.80    | 100°      |
| TE26   | 13.00   | 3.00    | 7.00    | 80°       |
| TE30   | 13.00   | 3.50    | 7.00    | 80°       |
| TE31   | 13.00   | 4.50    | 6.00    | 76°       |
| TE19   | 13.00   | 5.50    | 6.00    | 80°       |
| TE32   | 13.00   | 7.10    | 6.00    | 60°       |
| TE27*  | 13.90   | 3.00    | 11.00   | 90° & 90° |
| TE33   | 14.00   | 4.50    | 8.00    | 90°       |
| TE34   | 17.00   | 4.50    | 8.00    | 84°       |
| TE36*  | 20.00   | 3.00    | 17.50   | 90° & R8  |
| TE35   | 28.00   | 4.80    | 13.00   | 80°       |

\*tapered both ends

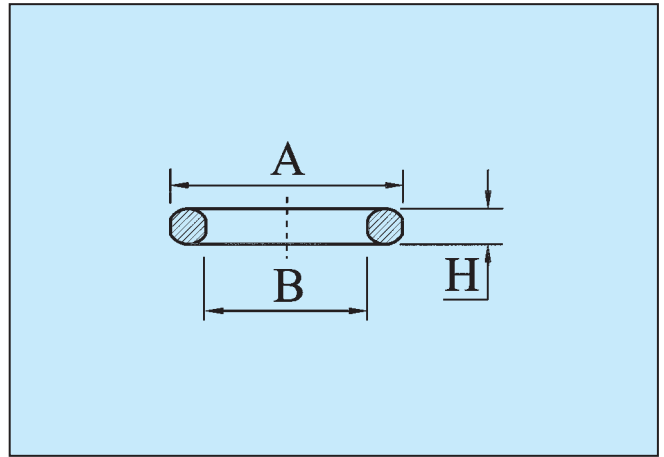
## Conical Eyelets



| Ref.No | A<br>mm | B<br>mm | C<br>mm | L<br>mm |
|--------|---------|---------|---------|---------|
| CE1    | 6.50    | 6.10    | 3.90    | 4.80    |
| CE2    | 6.70    | 6.30    | 3.10    | 4.75    |
| CE3    | 6.90    | 6.50    | 3.20    | 5.20    |
| CE13   | 8.50    | 8.00    | 5.50    | 5.00    |
| CE4    | 10.00   | 9.40    | 6.00    | 12.00   |
| CE11   | 10.60   | 8.75    | 3.10    | 17.50   |
| CE9    | 12.00   | 11.40   | 7.00    | 12.00   |
| CE8    | 12.50   | 11.80   | 6.50    | 15.00   |
| CE5    | 14.30   | 13.50   | 6.30    | 6.75    |
| CE10   | 18.00   | 17.00   | 10.20   | 15.75   |
| CE6    | 20.00   | 19.00   | 8.50    | 6.35    |
| CE12   | 32.00   | 28.00   | 16.50   | 35.00   |



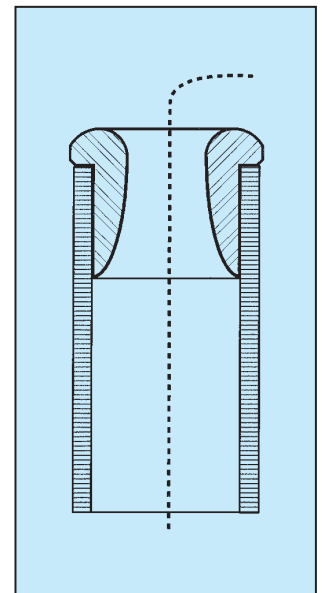
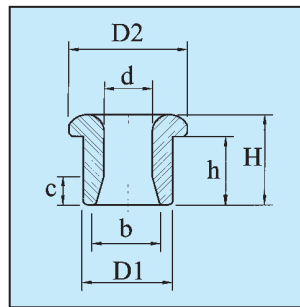
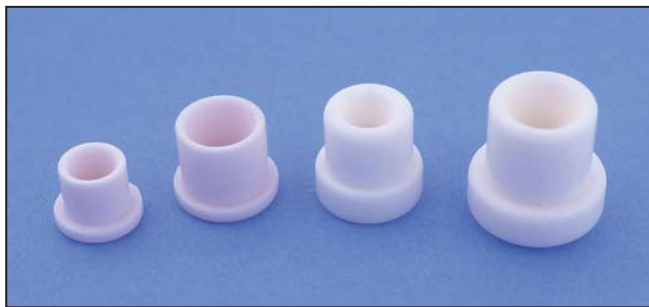
## Rings



| Ref.No | A<br>mm | B<br>mm | H<br>mm |
|--------|---------|---------|---------|
| R52    | 6.80    | 4.00    | 2.00    |
| R37    | 7.20    | 4.50    | 2.00    |
| R26    | 8.00    | 4.20    | 2.00    |
| R28    | 10.00   | 7.00    | 3.00    |

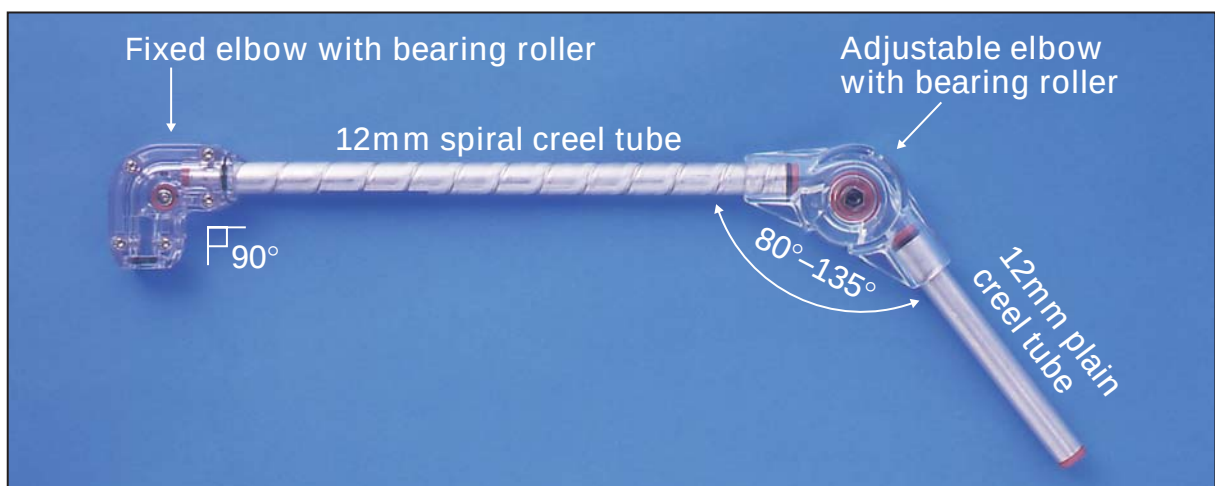
| Ref.No | A<br>mm | B<br>mm | H<br>mm |
|--------|---------|---------|---------|
| R19    | 14.00   | 11.00   | 1.30    |
| R18    | 15.20   | 11.70   | 1.40    |
| R34    | 18.80   | 13.20   | 3.30    |
| R35    | 20.00   | 14.00   | 3.00    |

## Flared Eyelets – for creel tubes and spindles



| Ref.No | D1<br>(max)<br>mm | d<br>mm | b<br>mm | H<br>mm | D2<br>mm | h<br>mm | c<br>mm |
|--------|-------------------|---------|---------|---------|----------|---------|---------|
| FE1    | 6.60              | 4.00    | 5.20    | 6.00    | 8.00     | 4.00    | 4.00    |
| FE2    | 7.10              | 3.80    | 5.50    | 7.00    | 9.20     | 5.30    | 2.20    |
| FE3    | 7.50              | 4.00    | 5.00    | 8.00    | 10.00    | 6.00    | 6.00    |
| FE4    | 9.10              | 6.00    | 7.40    | 7.00    | 11.00    | 5.00    | 3.00    |
| FE5    | 9.80              | 4.00    | 6.10    | 12.50   | 12.00    | 7.50    | 4.00    |
| FE6    | 10.00             | 6.00    | 7.70    | 10.00   | 12.00    | 8.00    | 6.00    |
| FE7    | 11.70             | 5.00    | 8.50    | 13.00   | 15.00    | 9.00    | 6.60    |

## Creel Tube System



**Rods and Tubes** can be made to any reasonable dimensions, subject to minimum batch sizes. For smaller quantities, the following standard diameters can be diamond cut to length. Many other 'non standard' diameters are usually held in stock as well.



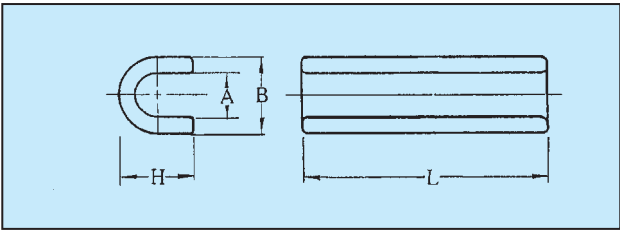
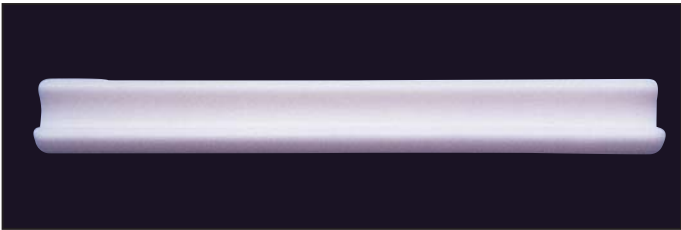
Rods

| Diameter (mm) |
|---------------|
| 1.5           |
| 2.0           |
| 2.5           |
| 3.0           |
| 4.0           |
| 5.0           |
| 6.0           |
| 8.0           |

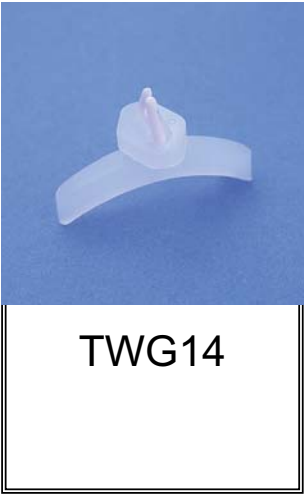
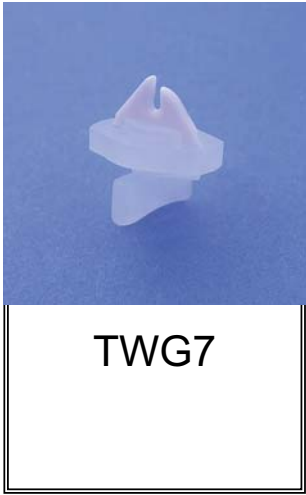
Tubes

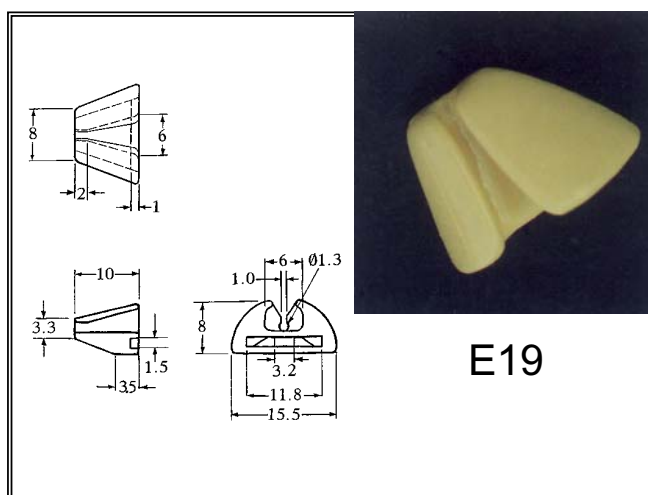
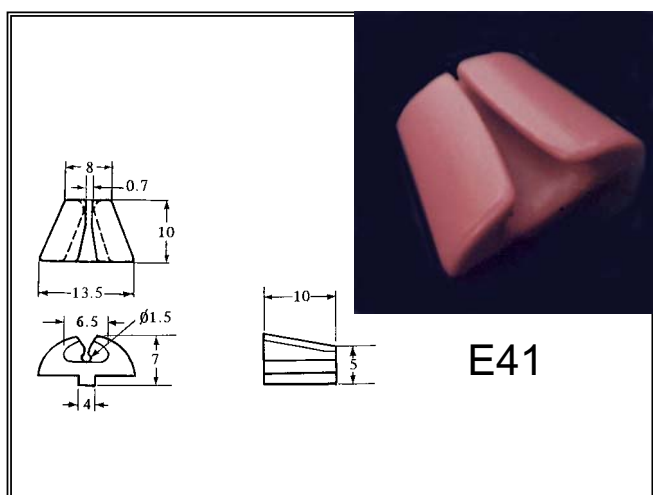
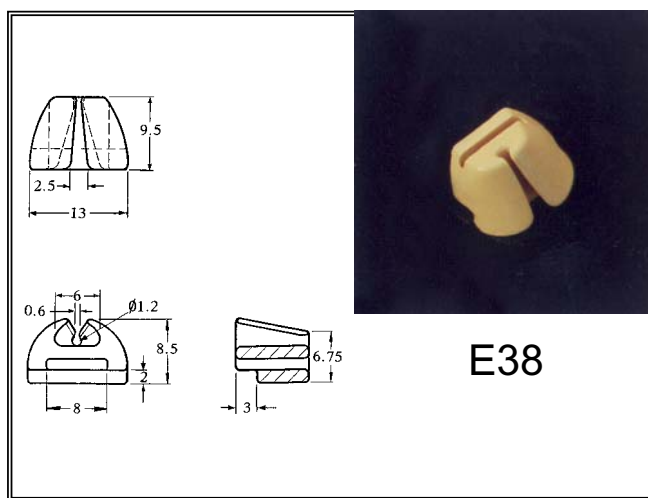
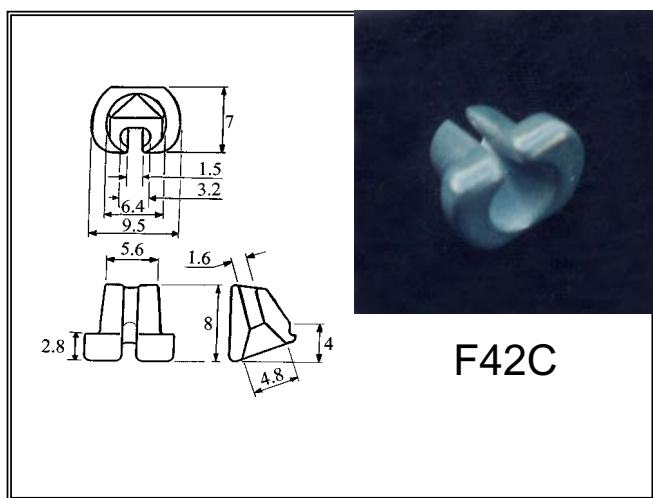
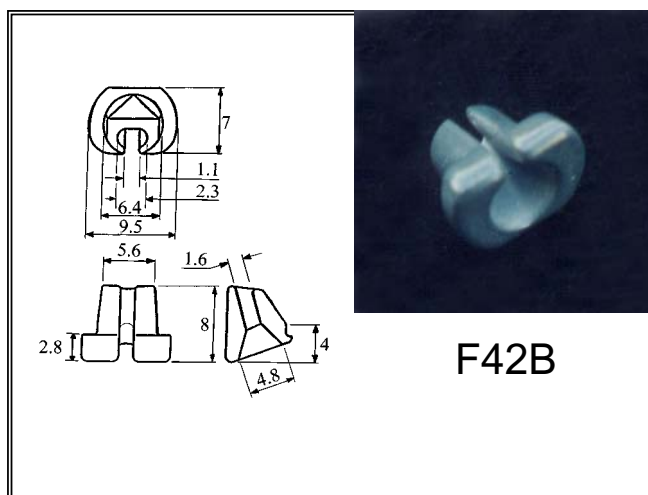
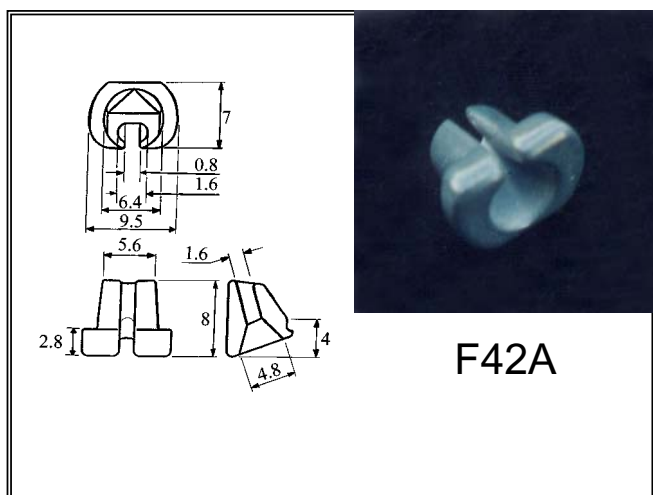
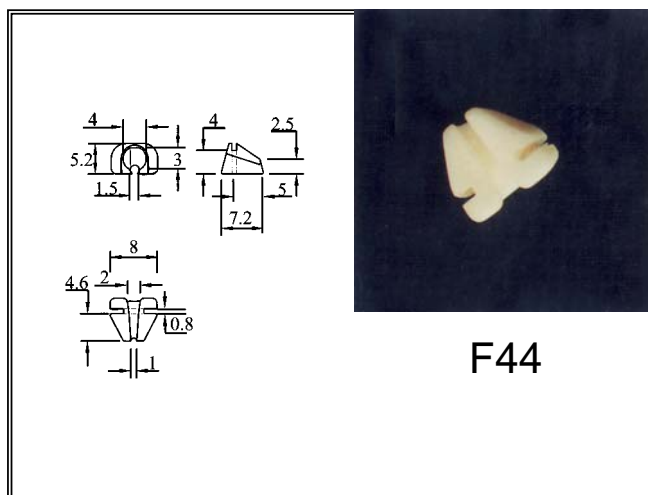
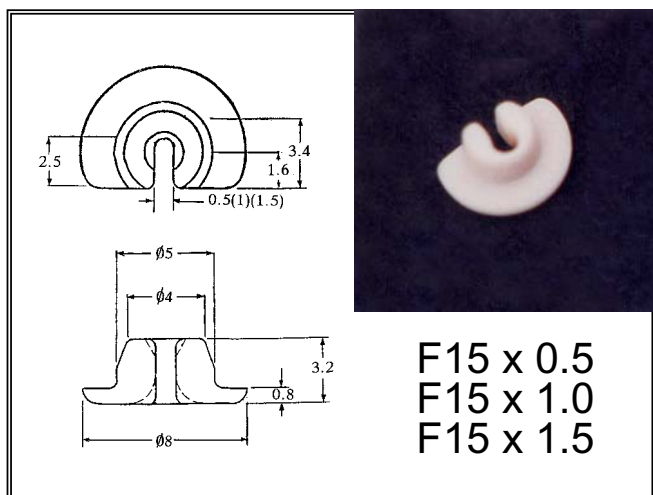
| Outside Diameter (mm) | Inside Diameter (mm) (to clear) |
|-----------------------|---------------------------------|
| 2.0                   | 1.0                             |
| 2.5                   | 1.5                             |
| 3.0                   | 2.0                             |
| 4.0                   | 2.0                             |
| 5.0                   | 3.0                             |
| 6.0                   | 3.0                             |
| 8.0                   | 5.0                             |
| 10.0                  | 5.0 (6.0) (6.8)                 |
| 12.0                  | 8.0                             |
| 15.0                  | 10.0                            |

**Edge Protectors (Half Tubes)** can be diamond slit to length from the following standard sizes.

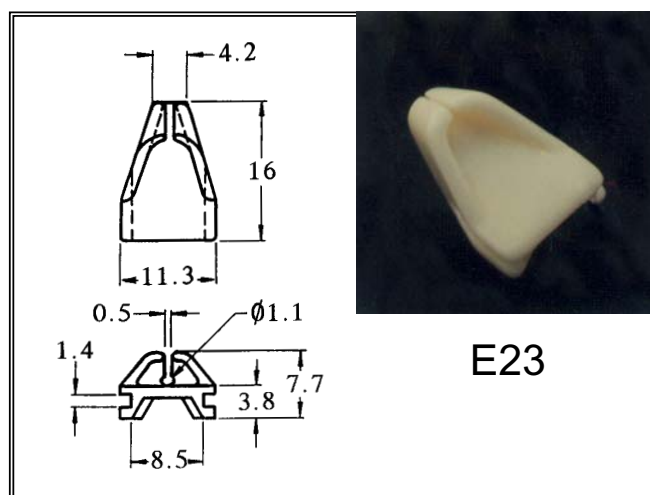
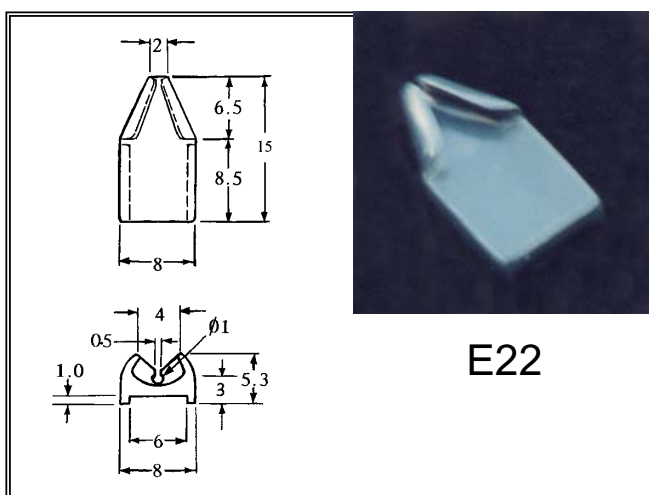
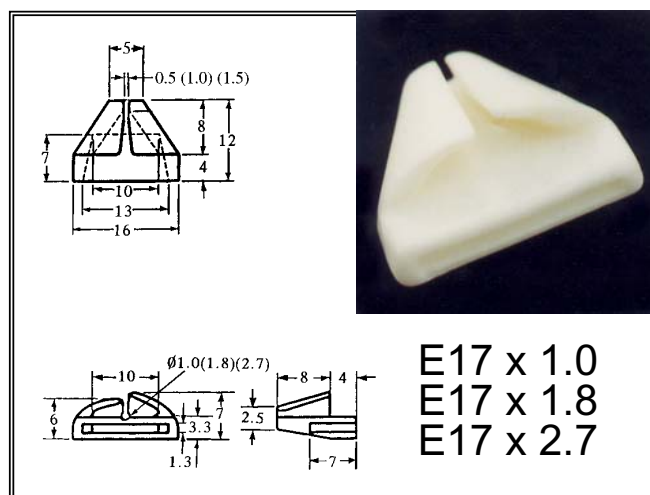
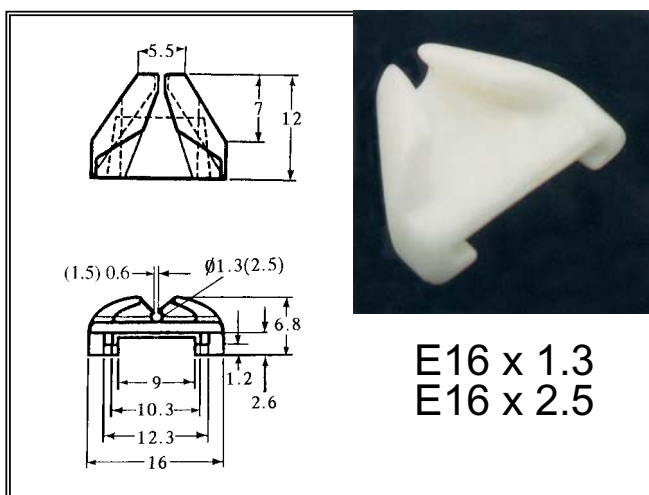
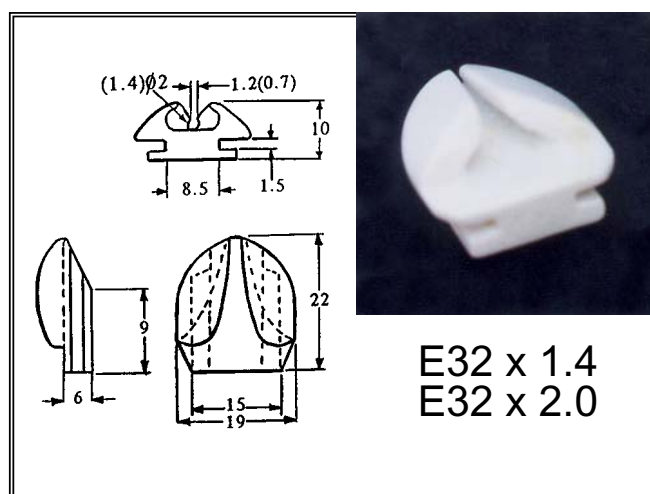
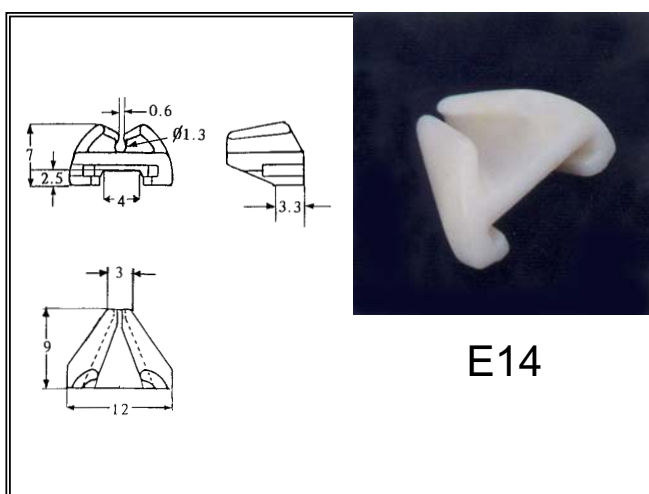
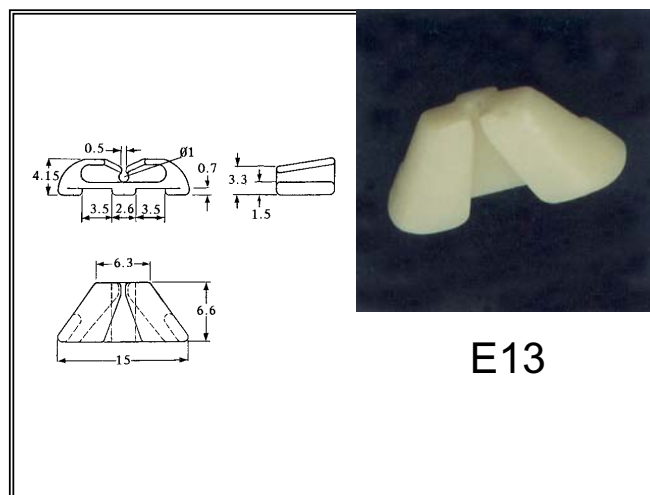
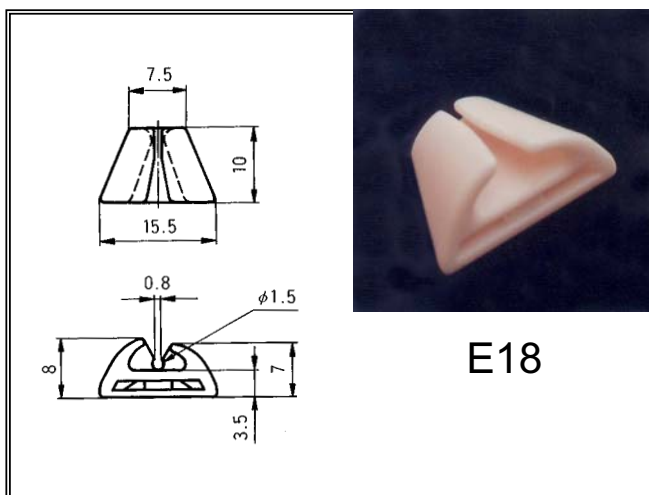


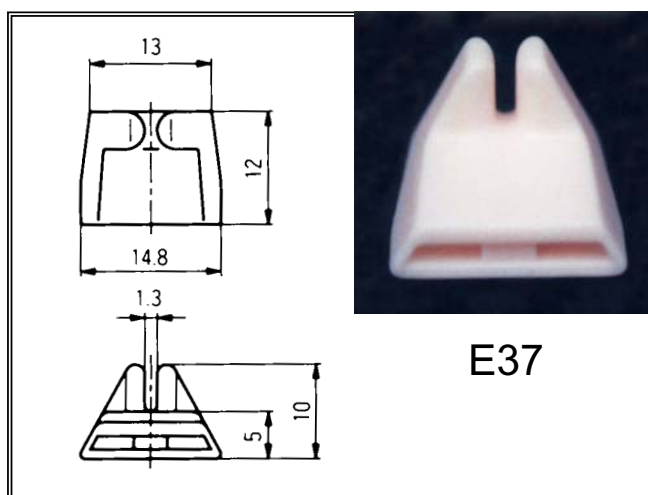
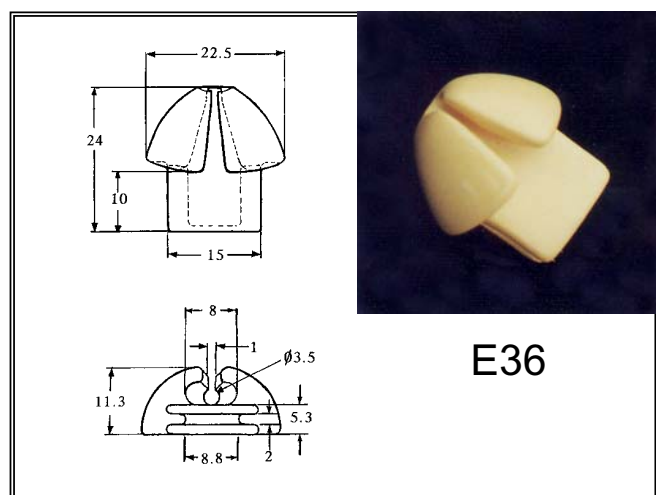
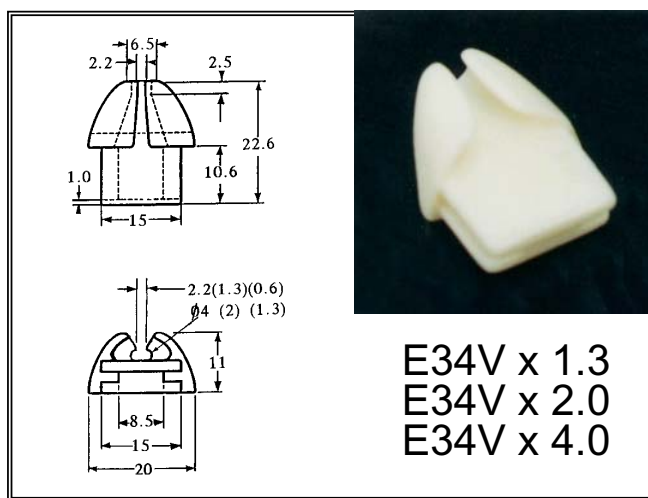
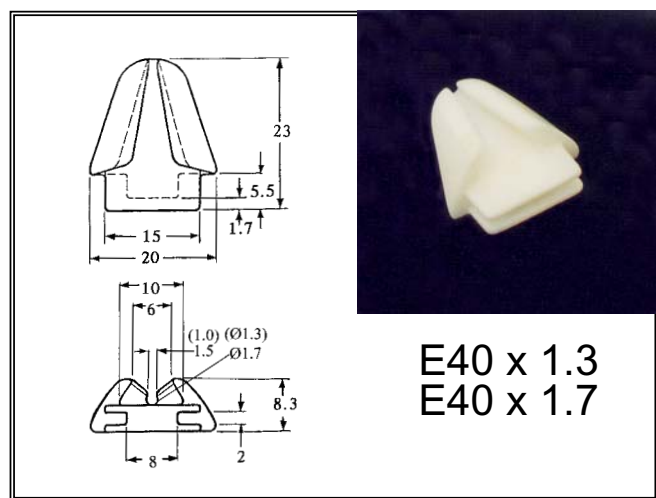
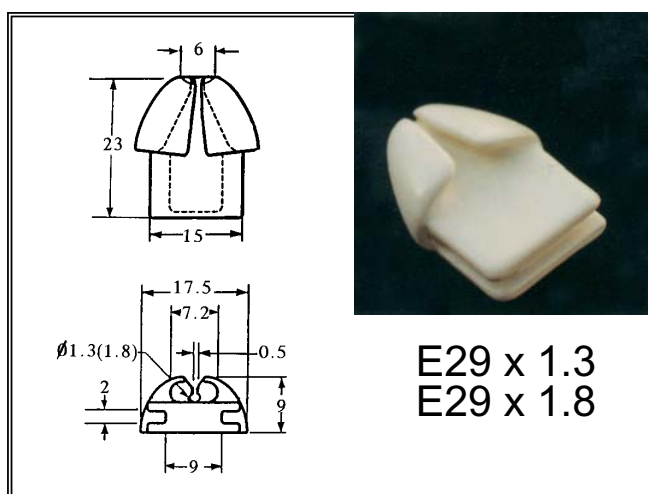
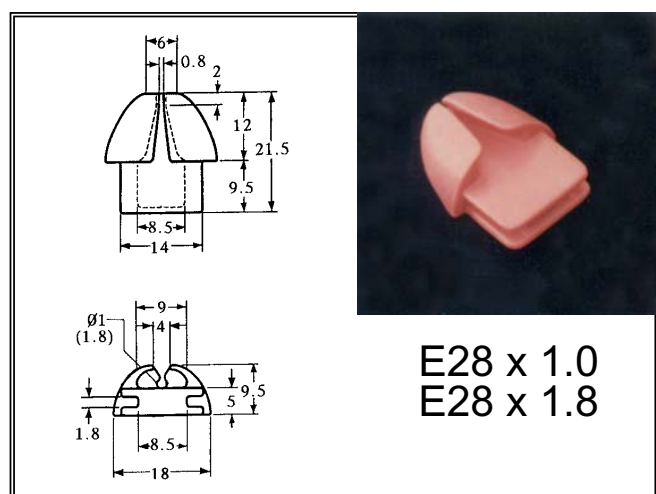
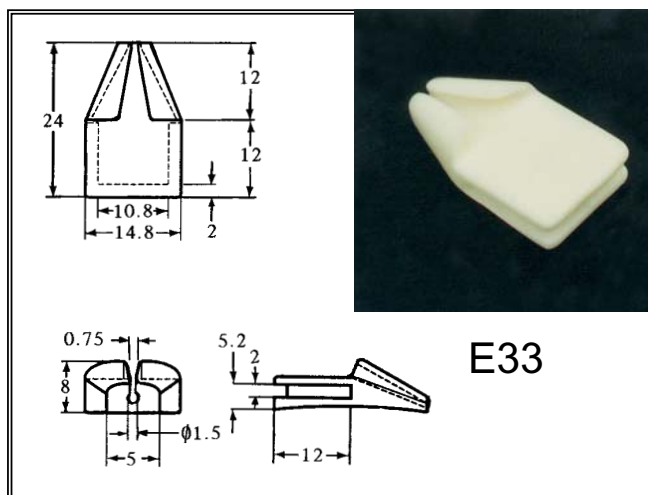
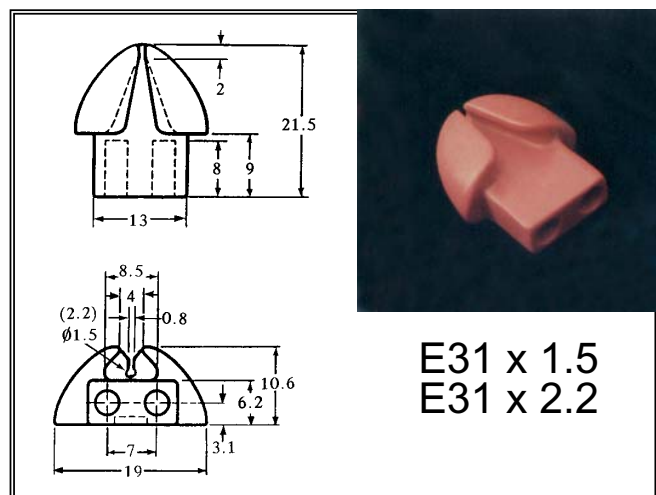
| Ref.No | A mm | B mm | H mm | L mm max | R1 mm | R2 mm |
|--------|------|------|------|----------|-------|-------|
| EP1    | 1.3  | 4.0  | 4.0  | 36.0     | 1.5   | 4.0   |
| EP2    | 2.0  | 4.0  | 4.0  | 50.0     | 2.0   | 4.0   |
| EP3    | 3.2  | 5.2  | 4.1  | 45.0     | 1.6   | 5.2   |
| EP4    | 4.0  | 7.0  | 6.5  | 62.0     | 2.0   | 3.5   |
| EP5    | 5.0  | 8.0  | 8.0  | 62.0     | 2.5   | 4.0   |
| EP6    | 6.0  | 9.0  | 9.5  | 62.0     | 3.0   | 4.5   |

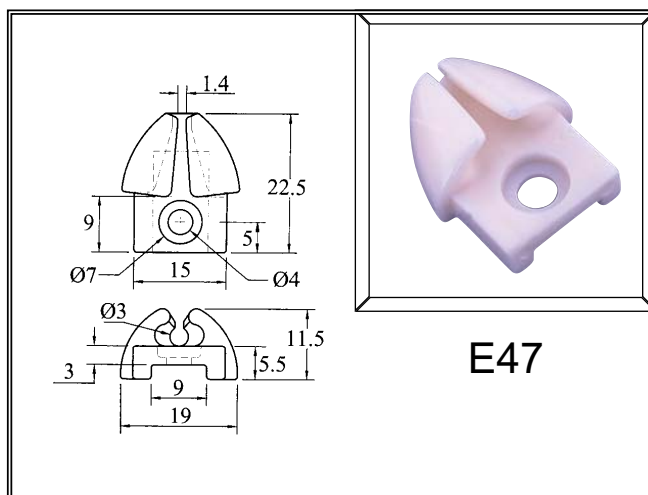
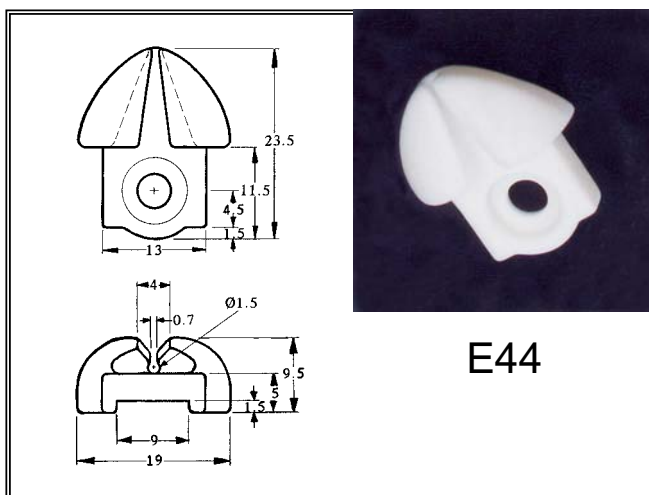
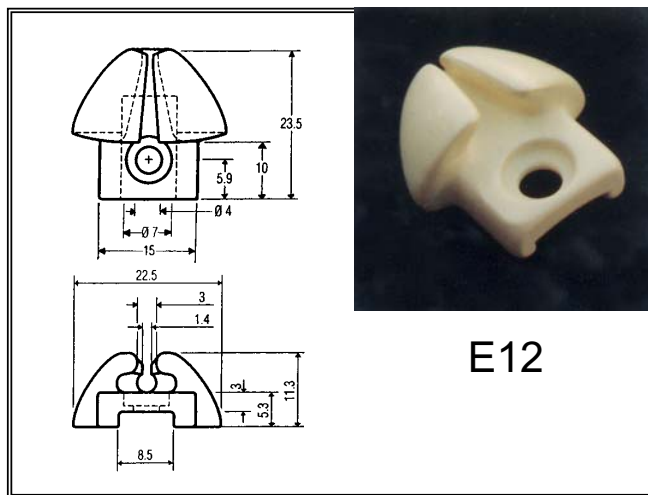
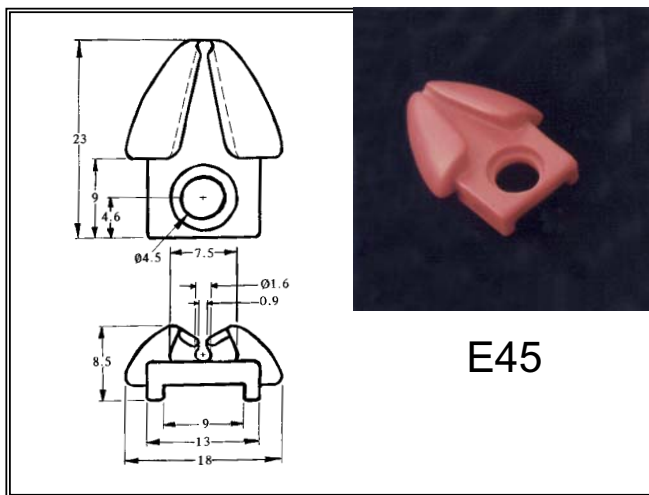
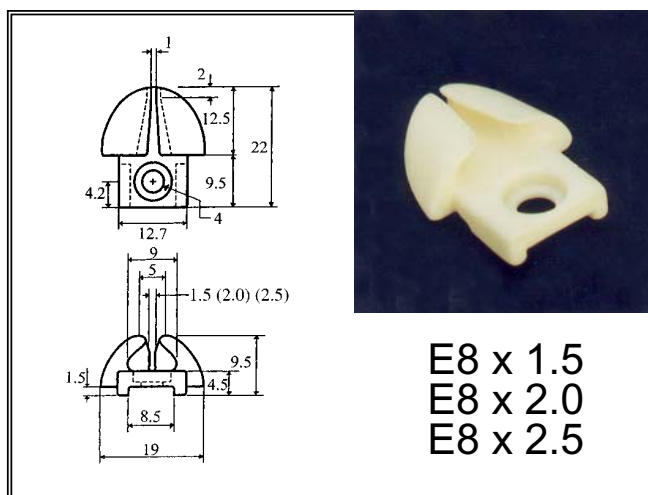
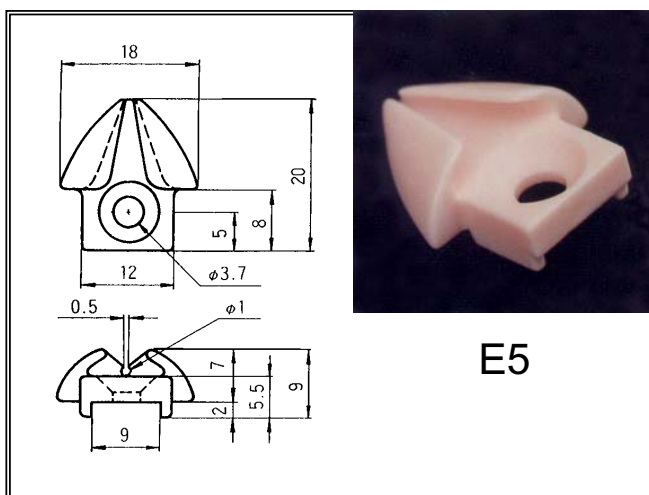
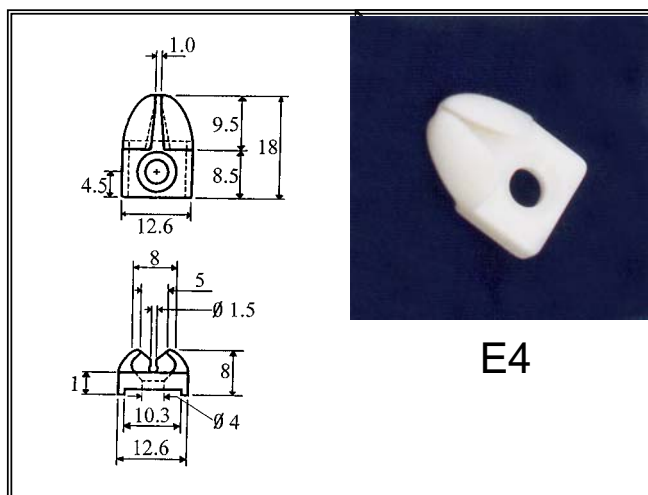
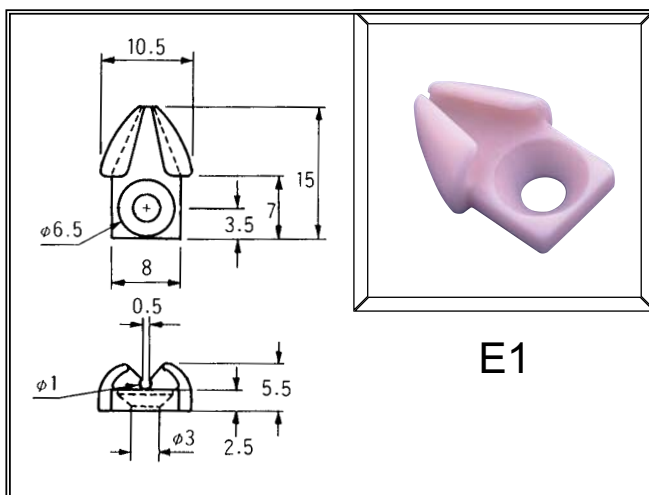


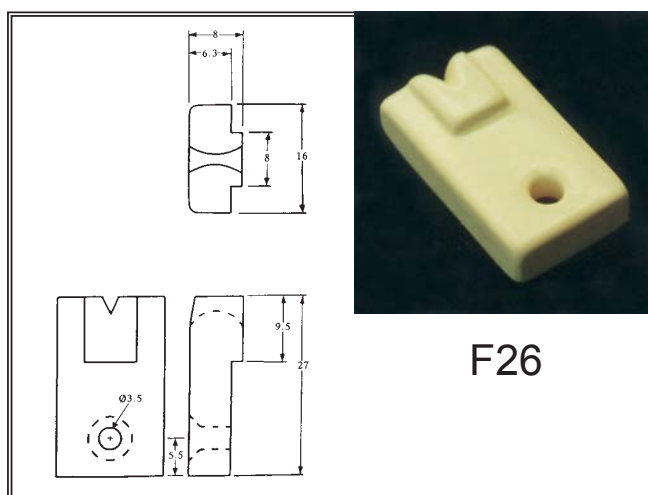
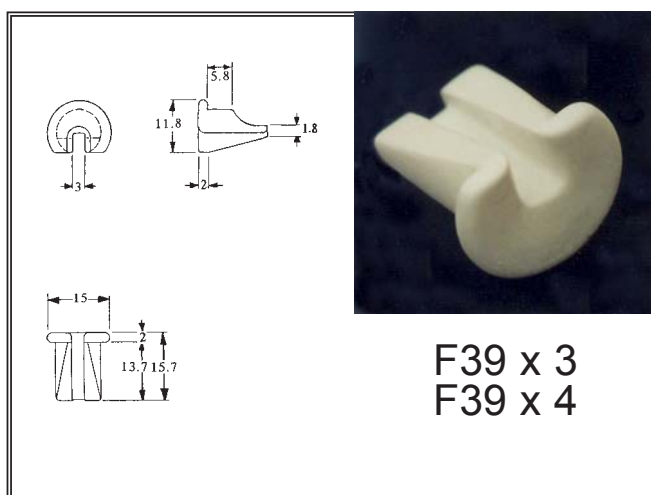
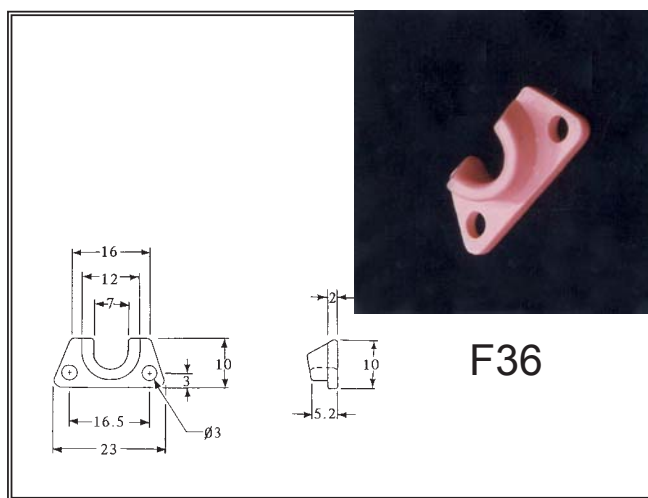
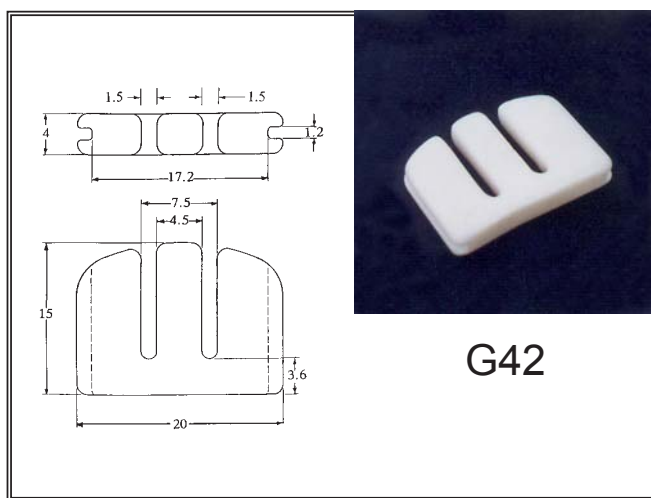
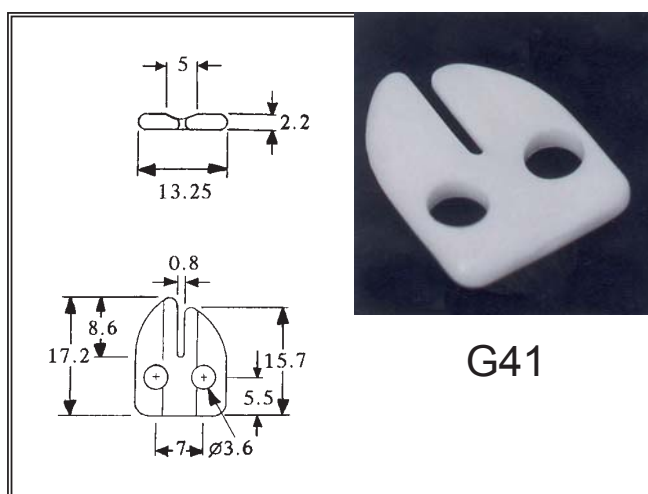
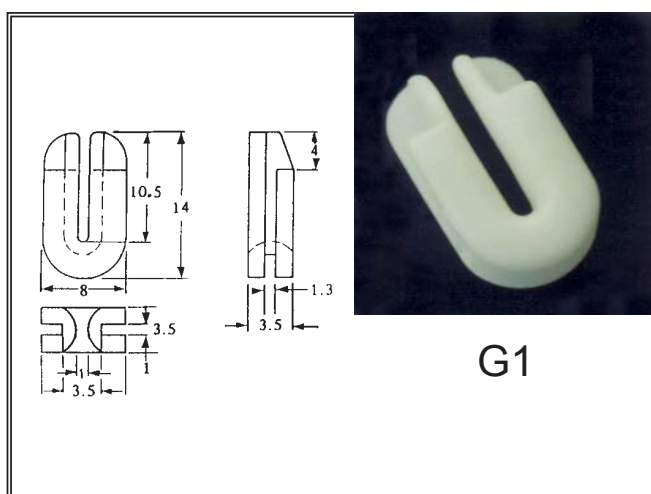
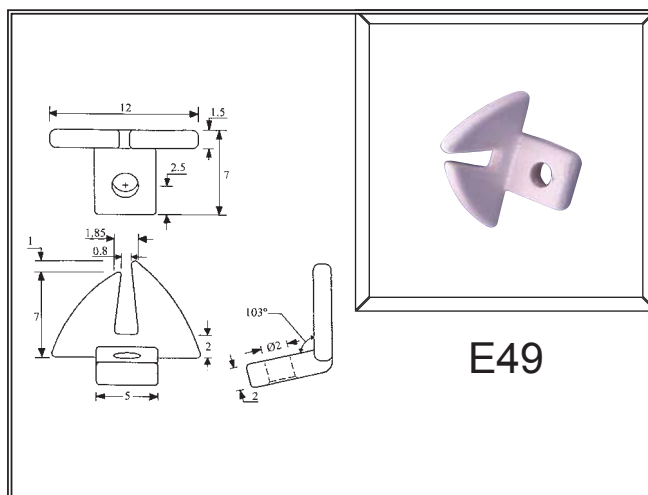
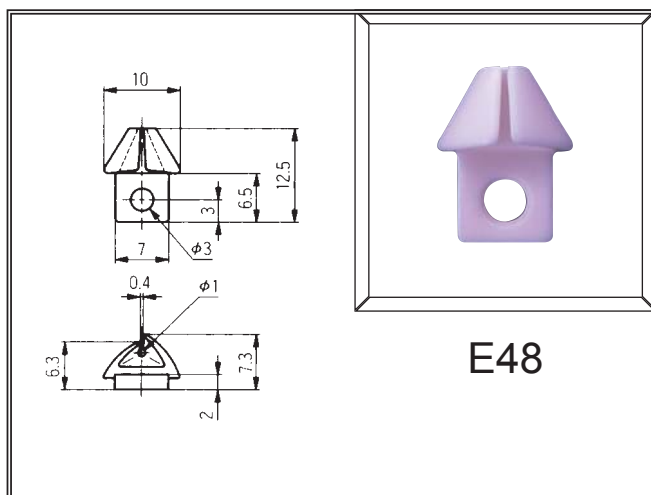




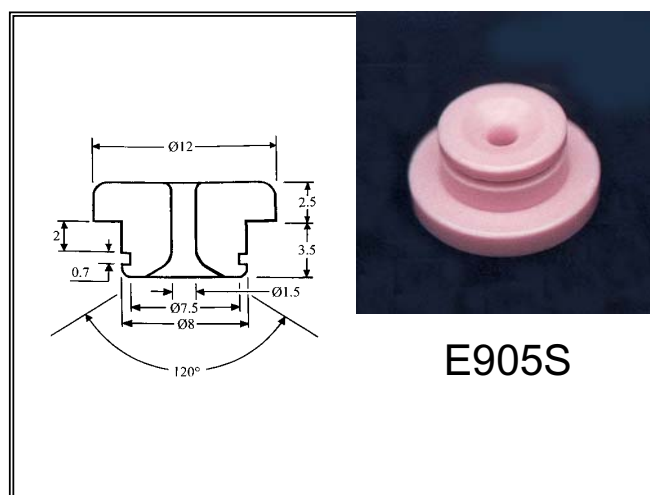
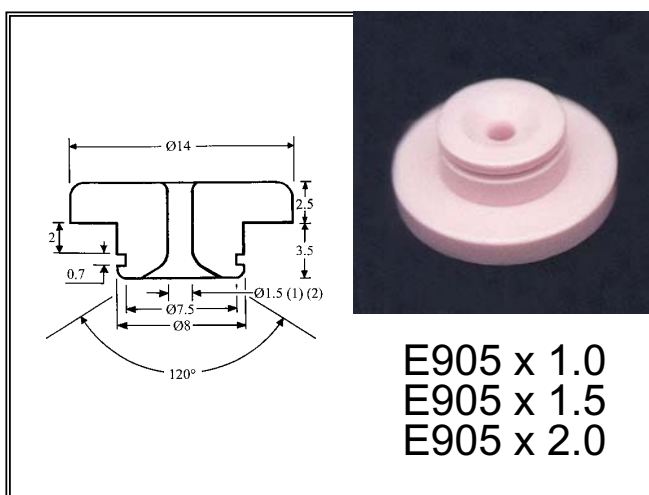
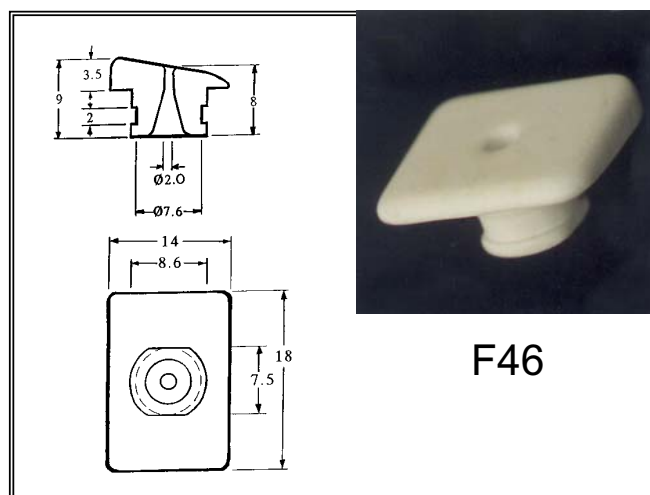
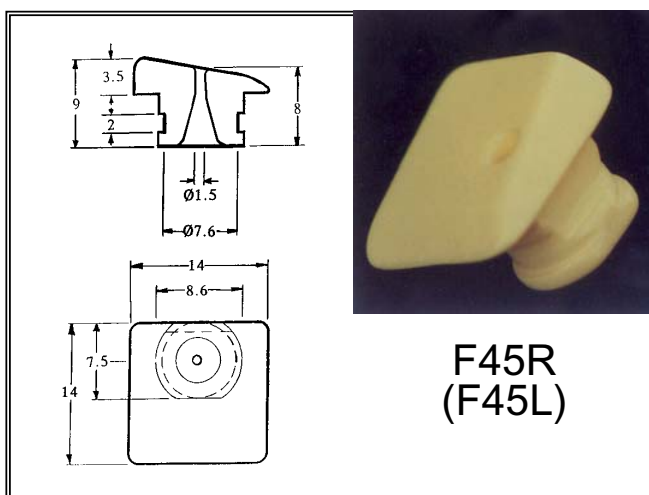
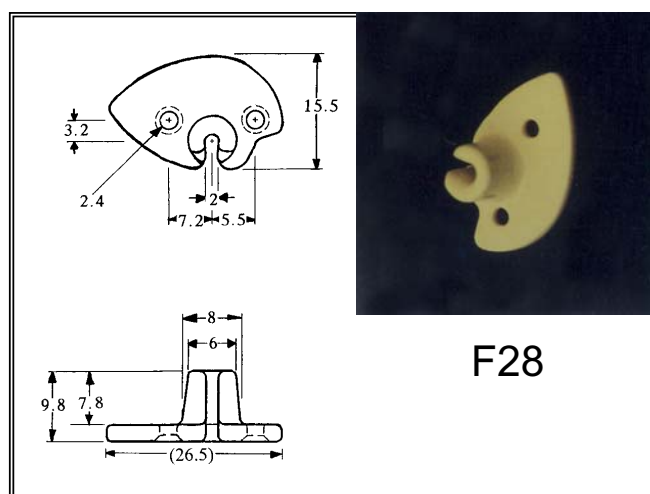
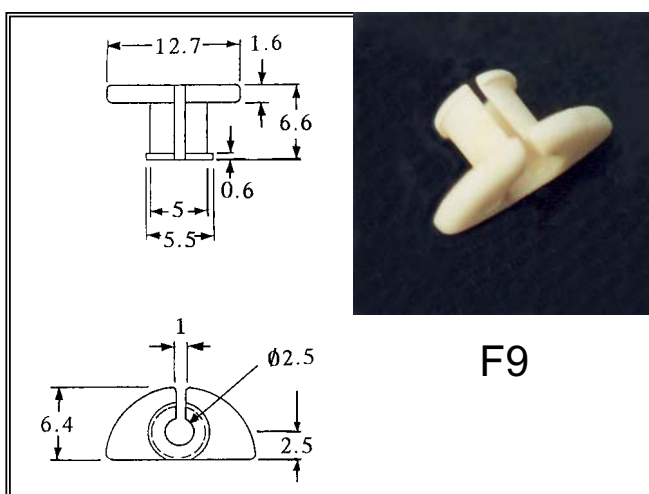
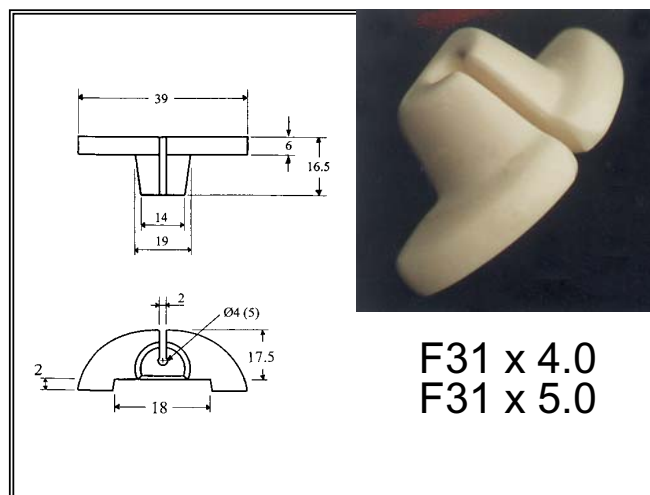
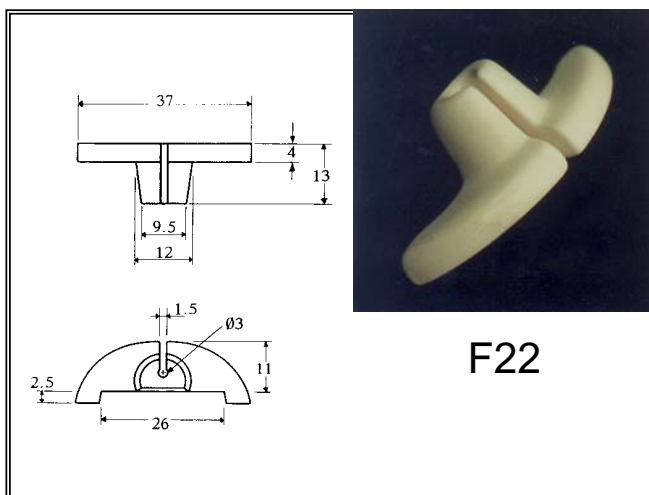


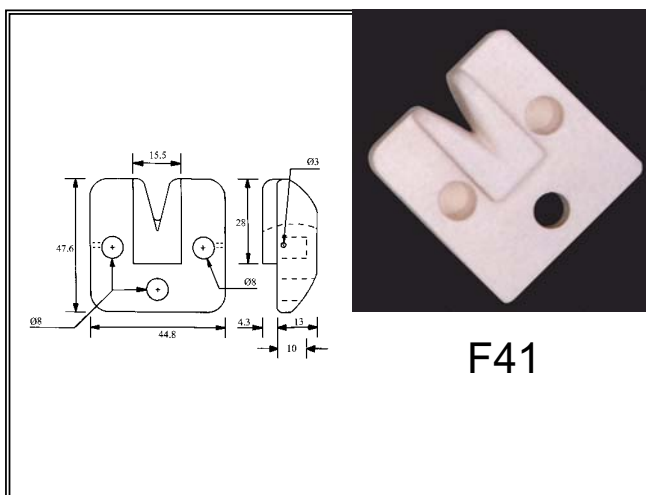
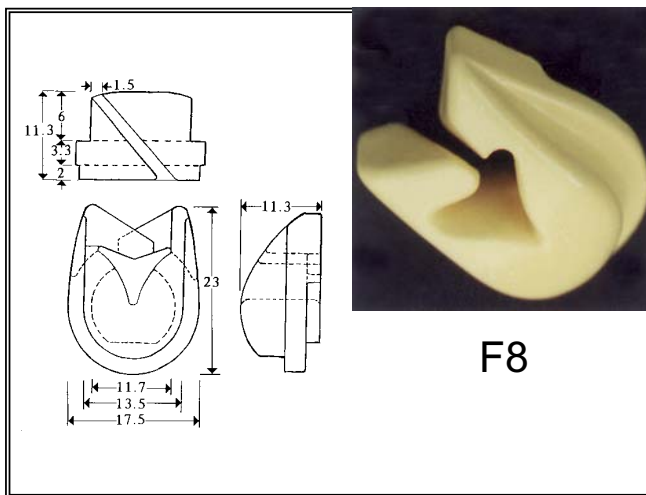
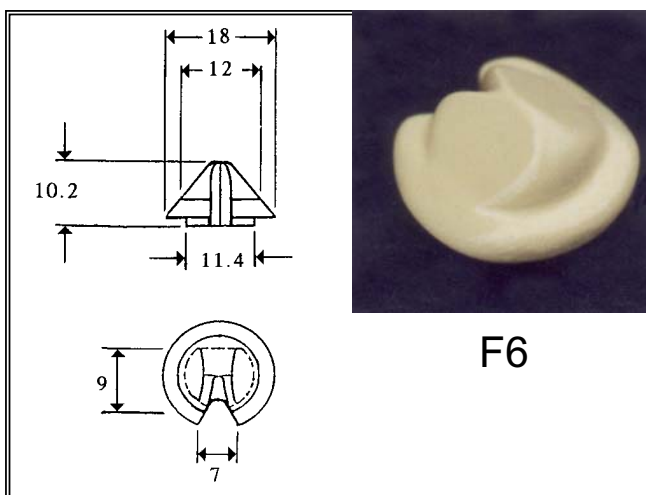
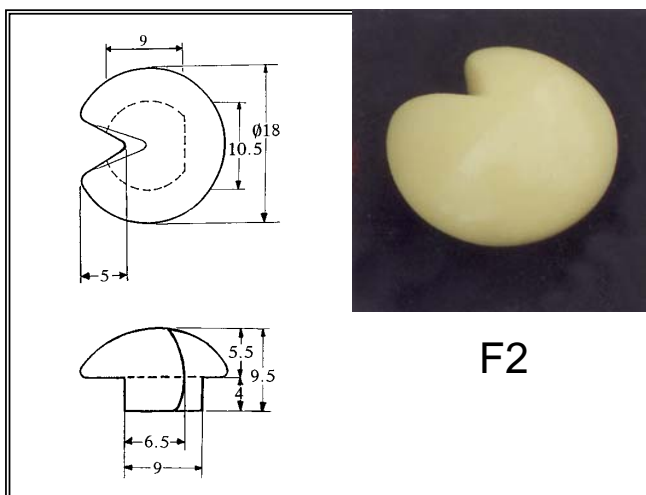


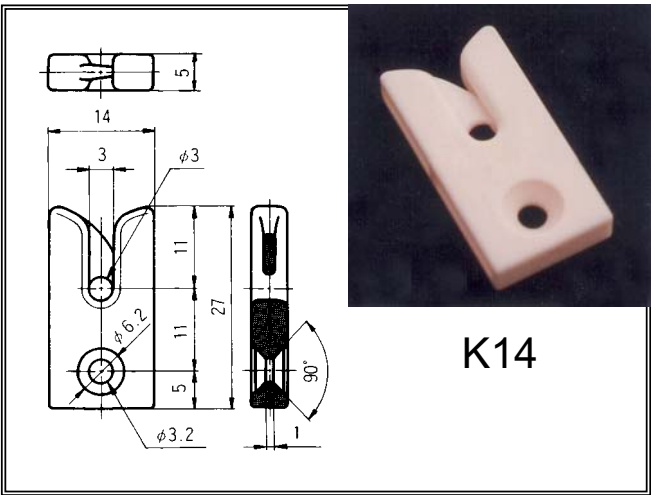
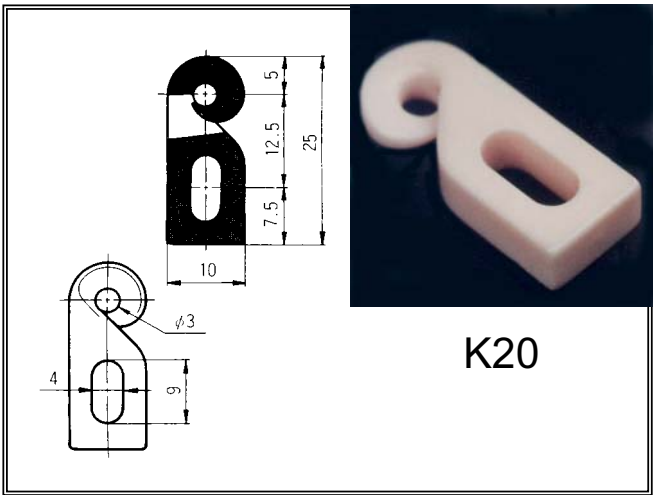
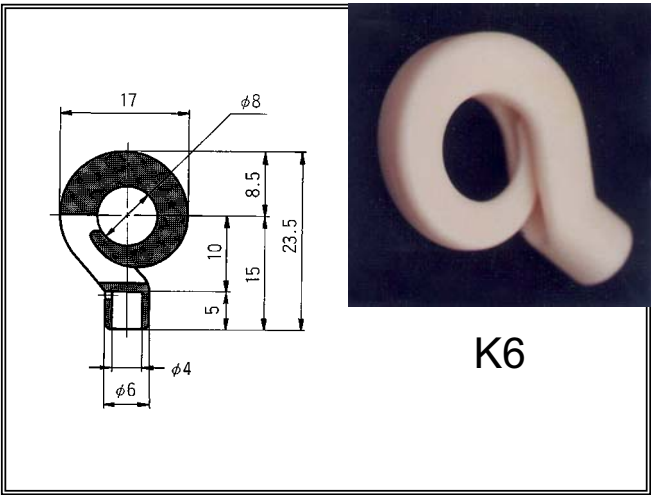
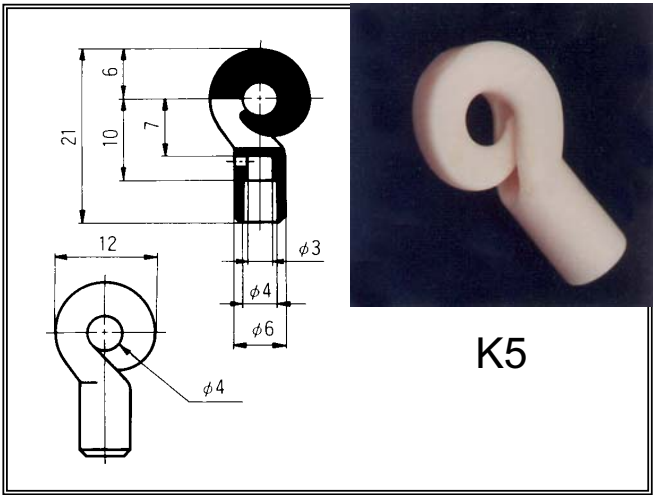
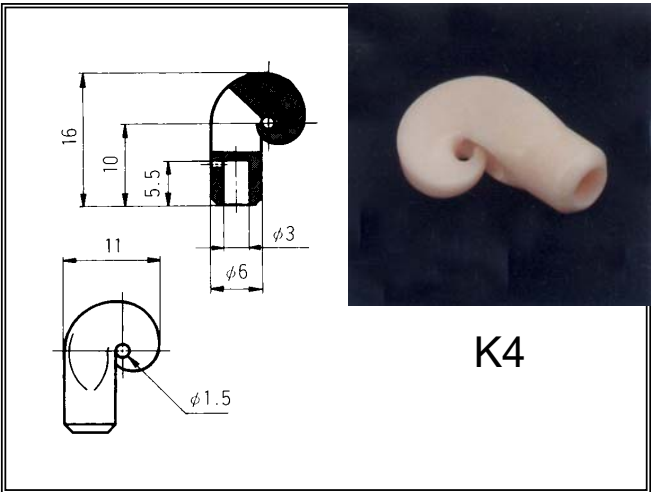
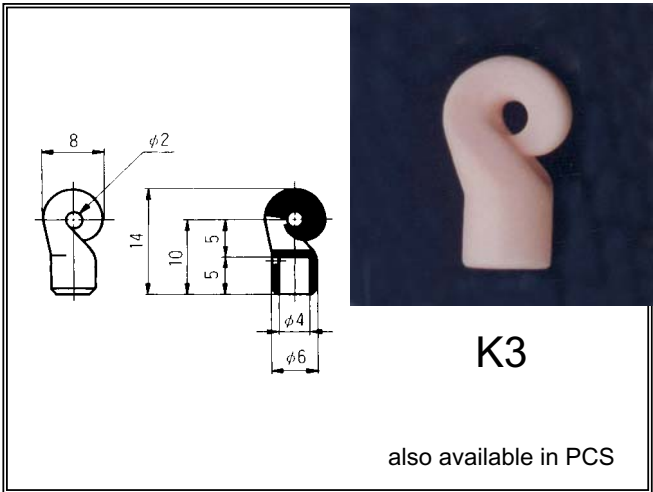
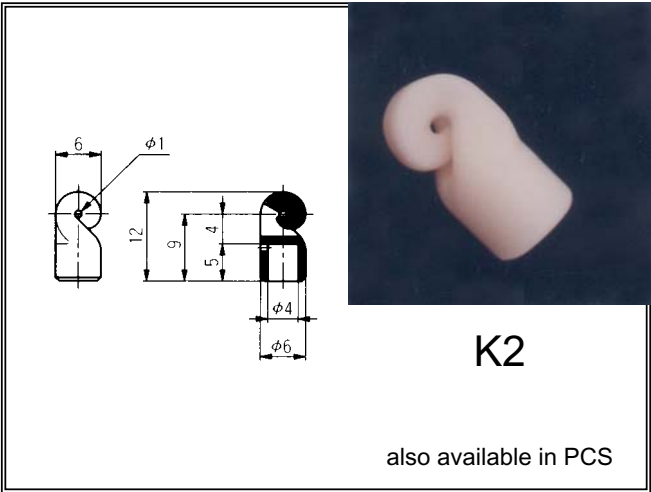
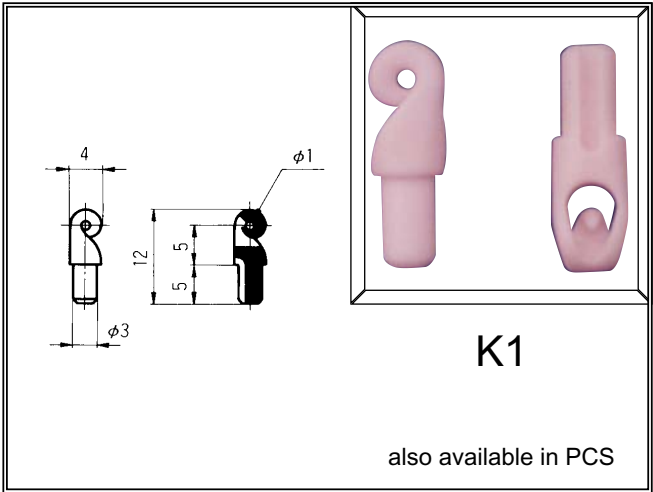


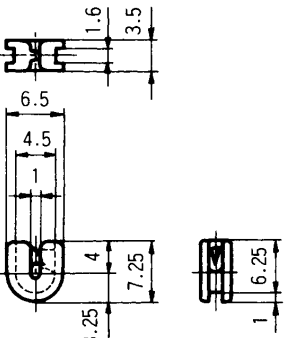










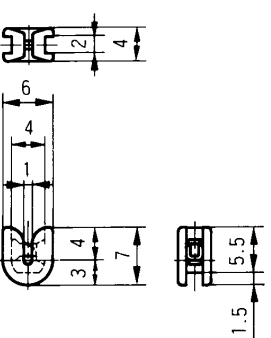


Technical drawing of K19 showing dimensions: 1.6, 3.5, 6.5, 4.5, 1, 4, 7.25, 3.25, 6.25, 1.



**K19**

also available in PCS

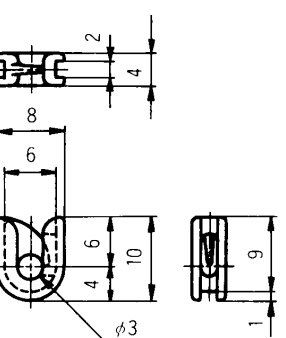


Technical drawing of K19-1 showing dimensions: 2, 4, 6, 4, 1, 4, 7, 3, 5.5, 1.5.



**K19-1**

with separate hook

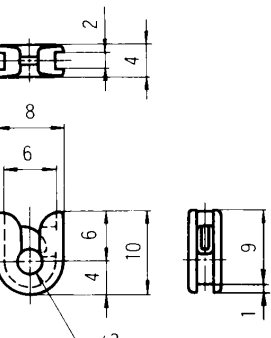


Technical drawing of K18 showing dimensions: 2, 4, 8, 6, 6, 6, 10, 4, 9, 1,  $\phi 3$ .



**K18**

also available in PCS

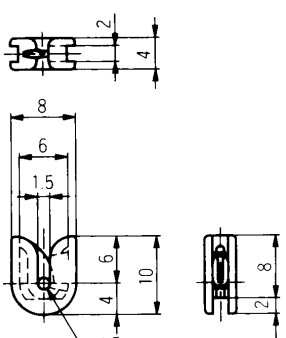


Technical drawing of K18-1 showing dimensions: 2, 4, 8, 6, 6, 6, 10, 4, 9, 1,  $\phi 3$ .



**K18-1**

with separate hook

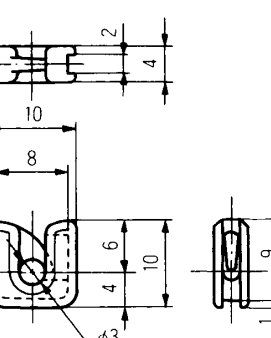


Technical drawing of K33 showing dimensions: 2, 4, 8, 6, 1.5, 4, 6, 10, 4, 8, 2,  $\phi 1.5$ .



**K33**

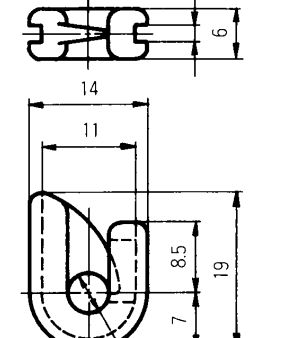
also available in PCS



Technical drawing of K17 showing dimensions: 2, 4, 10, 8, 6, 6, 10, 4, 9, 1,  $\phi 3$ .



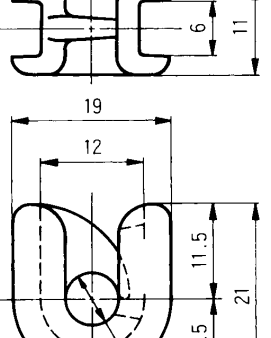
**K17**



Technical drawing of K24 showing dimensions: 2, 6, 14, 11, 8.5, 19, 7,  $\phi 5$ .



**K24**

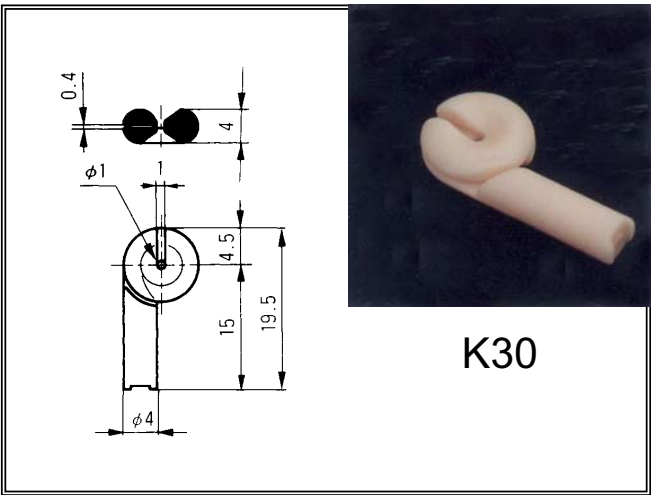
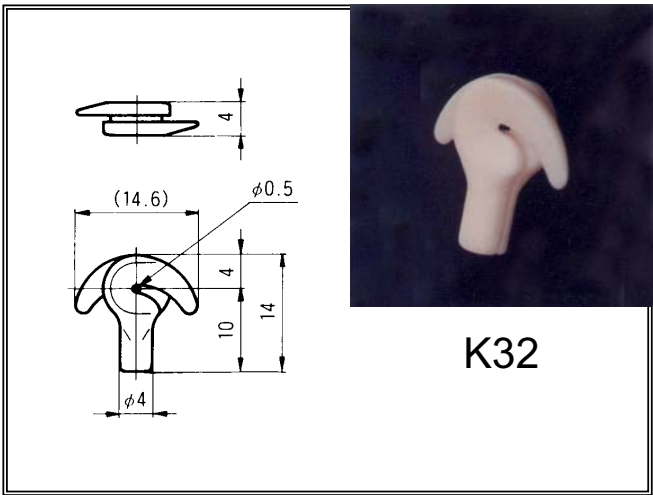
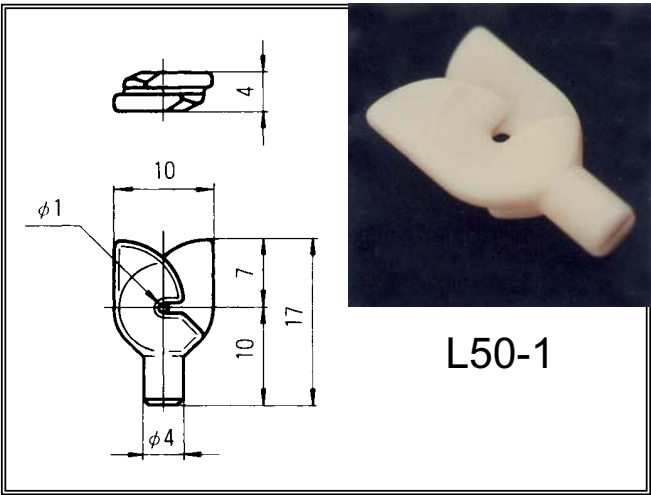
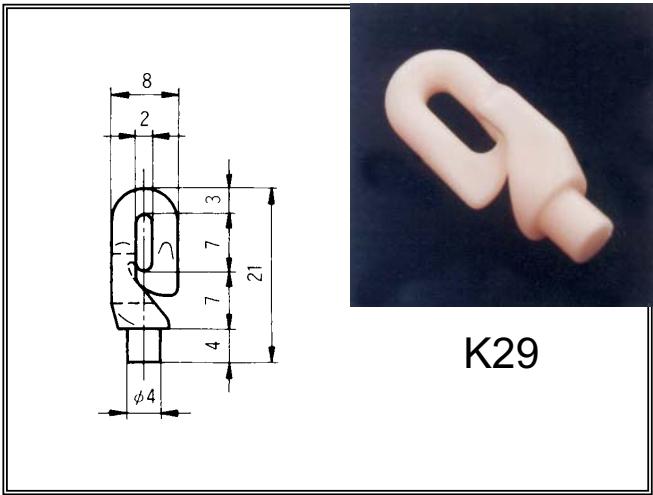
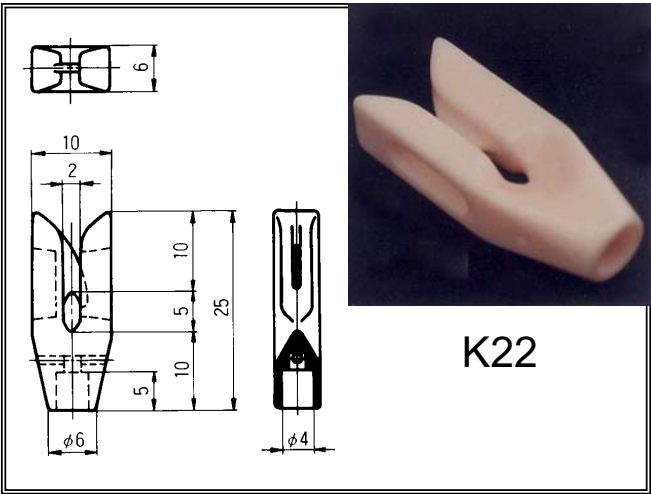
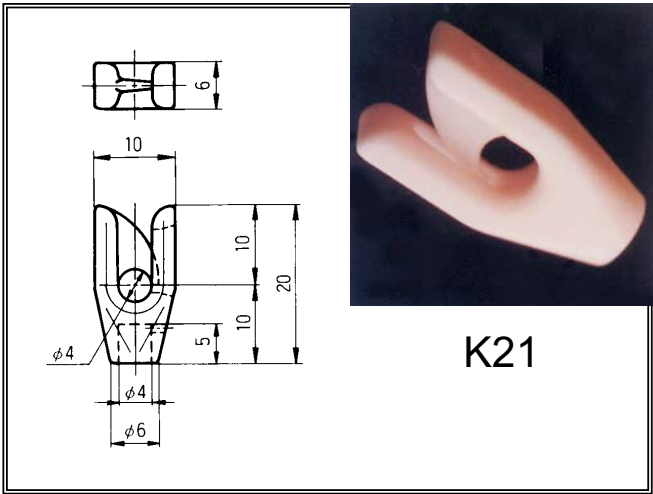
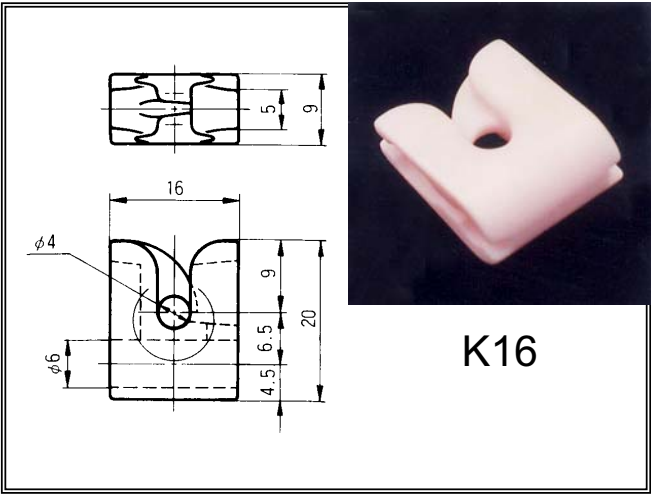
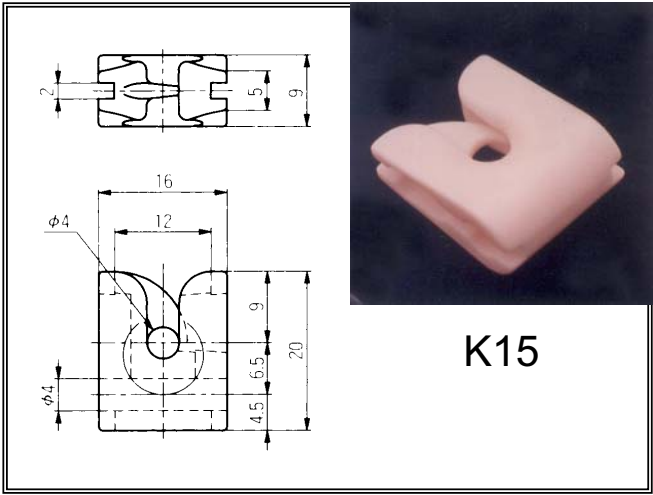


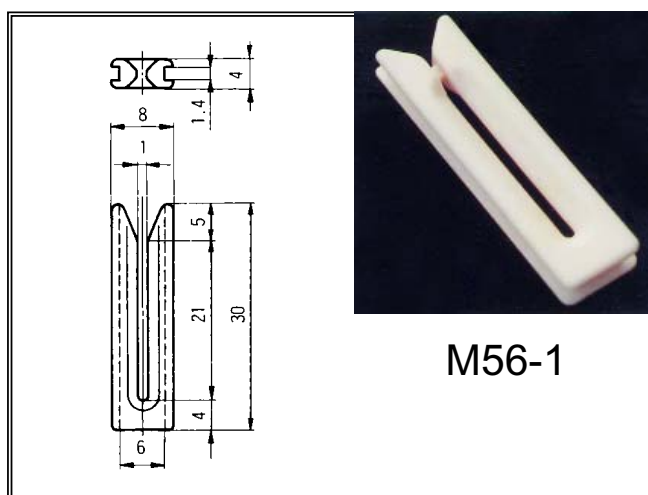
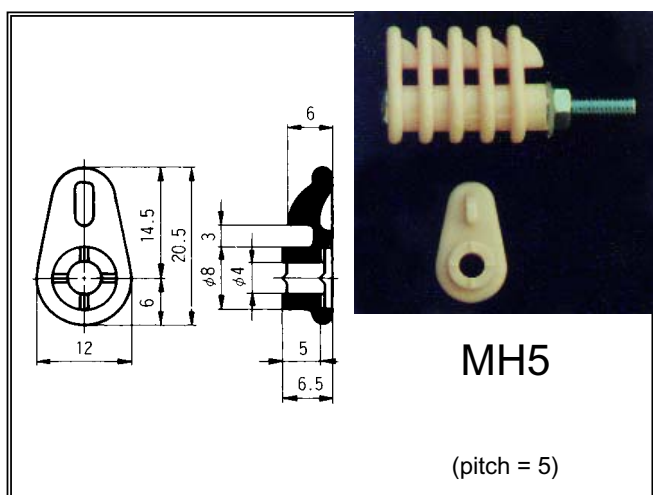
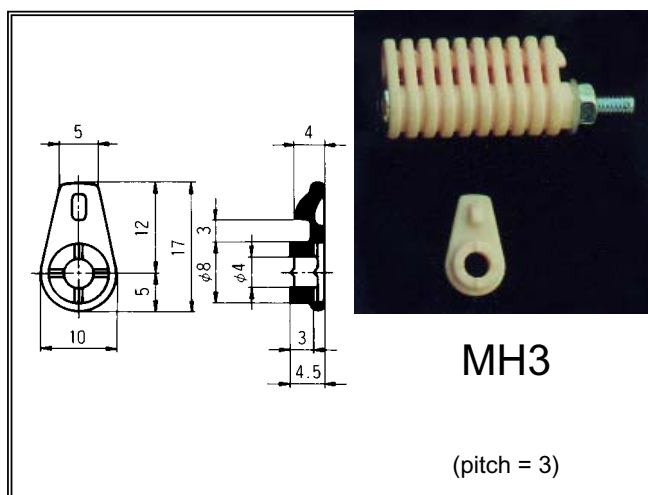
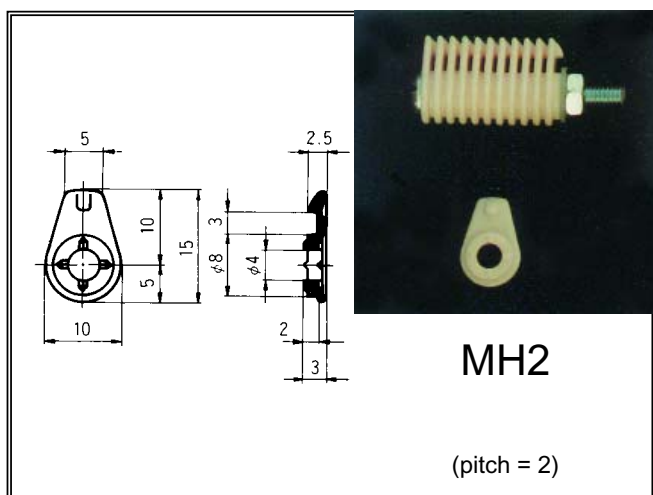
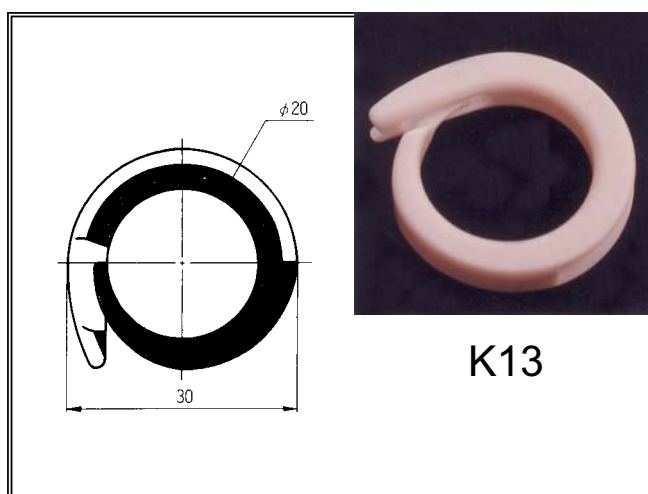
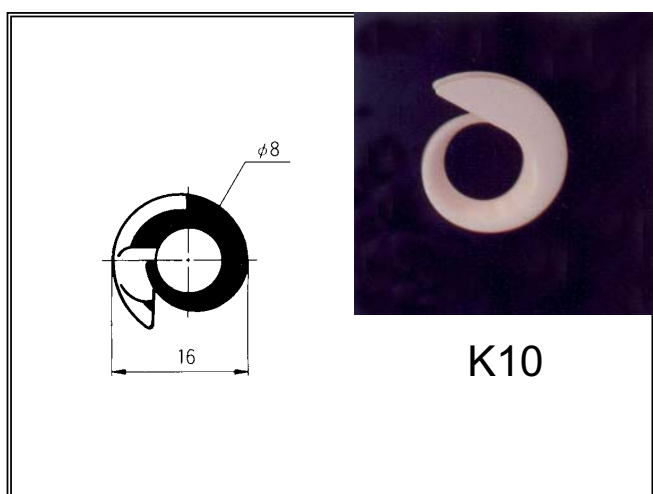
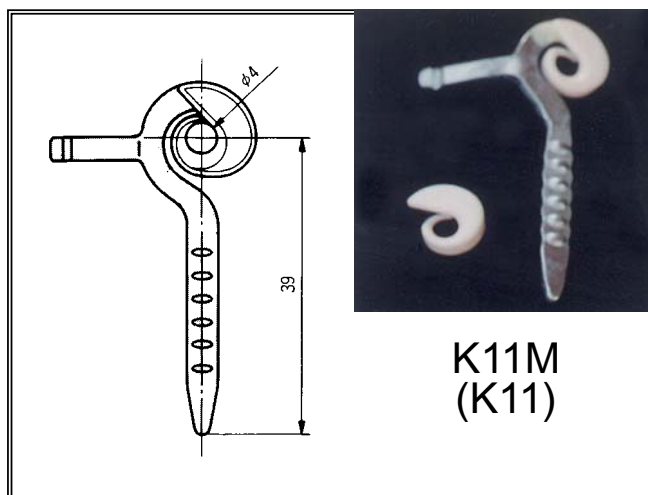
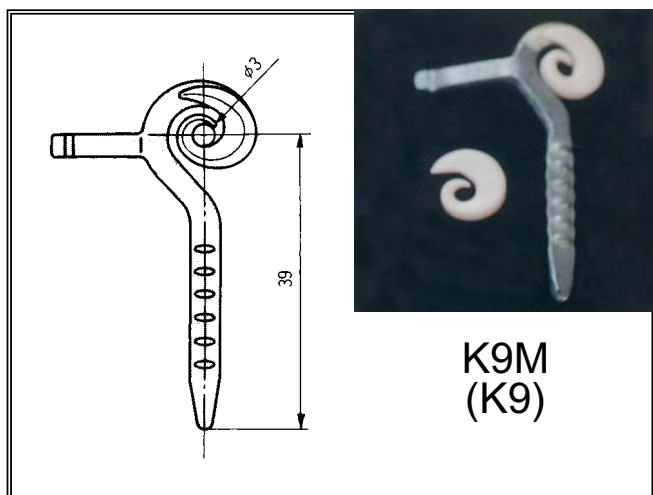
Technical drawing of K25 showing dimensions: 6, 11, 19, 12, 11.5, 21, 9.5,  $\phi 6$ .

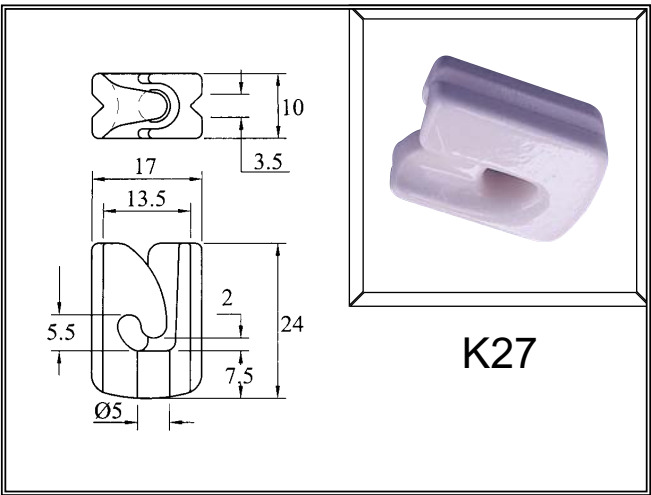
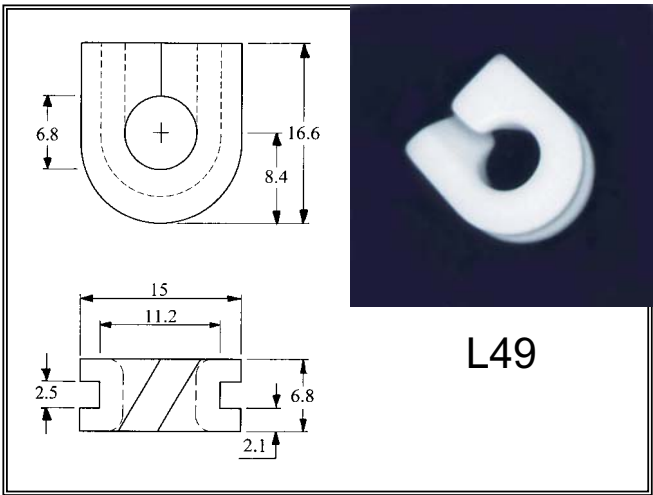
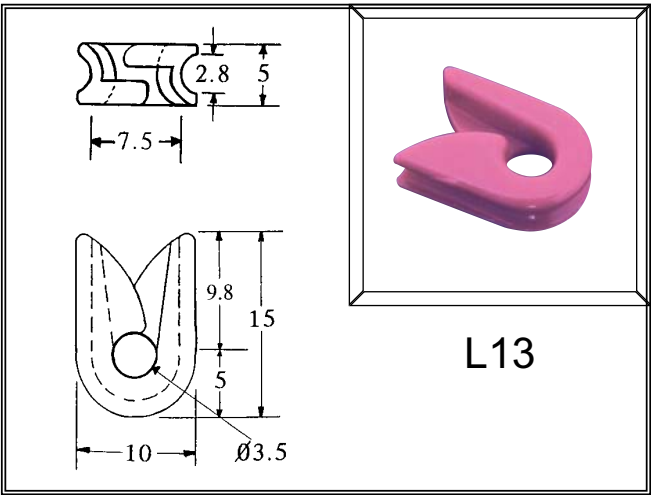
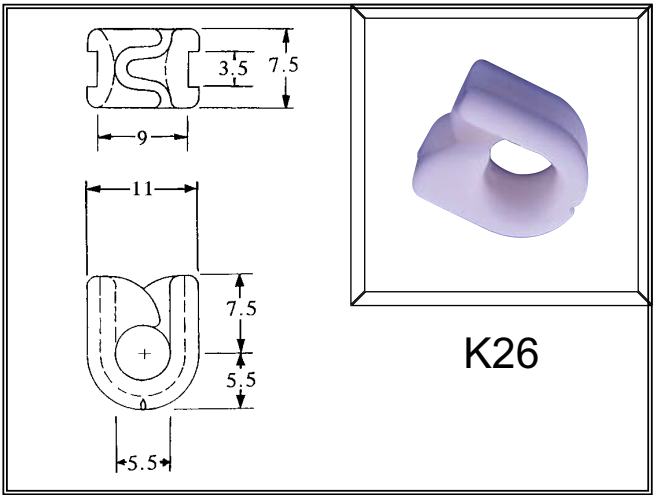
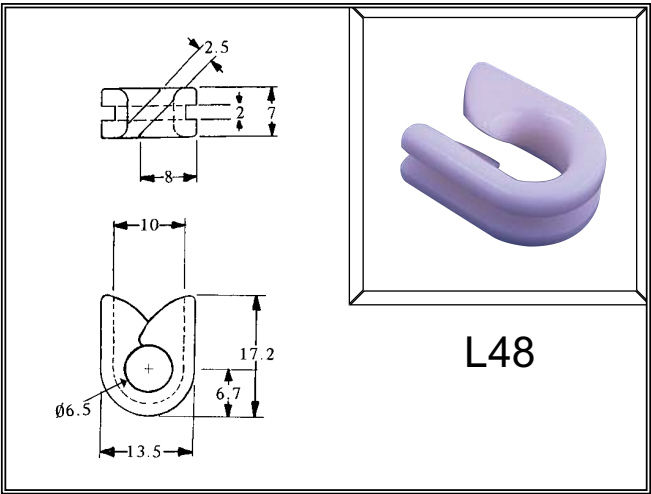
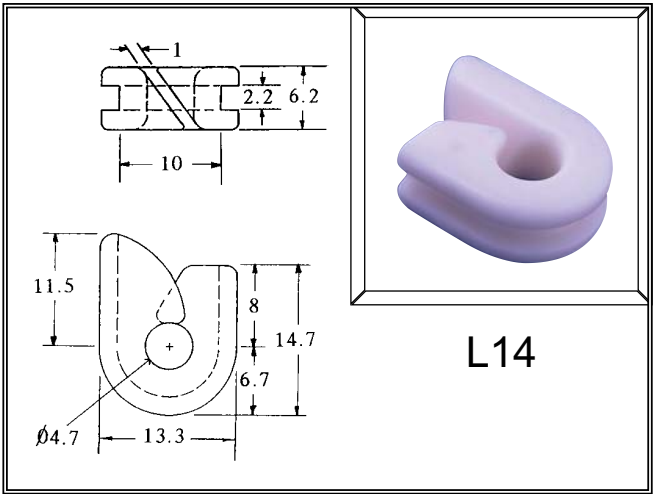
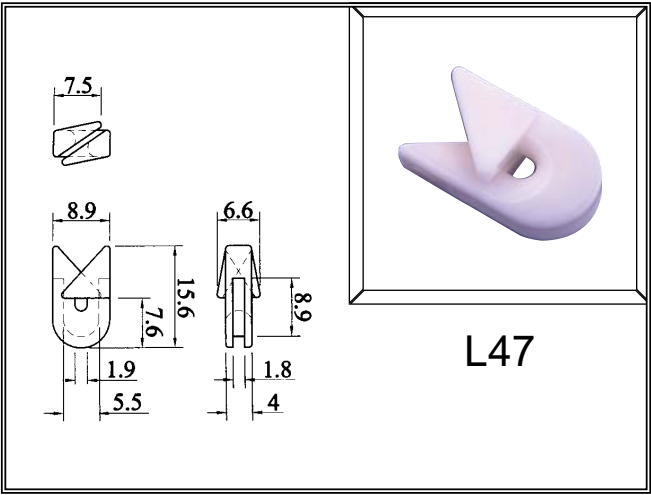
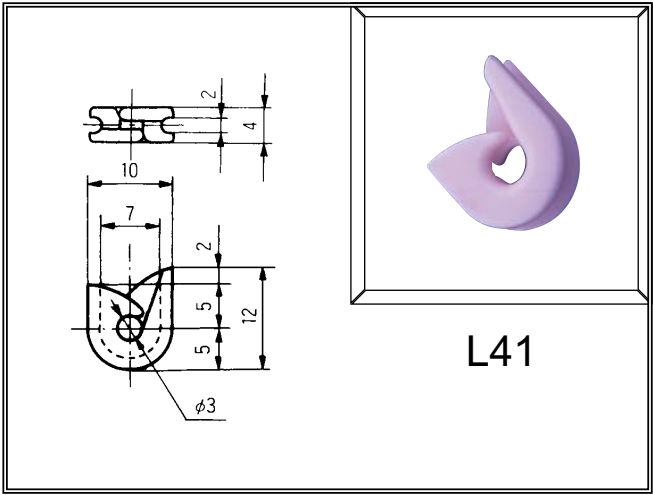


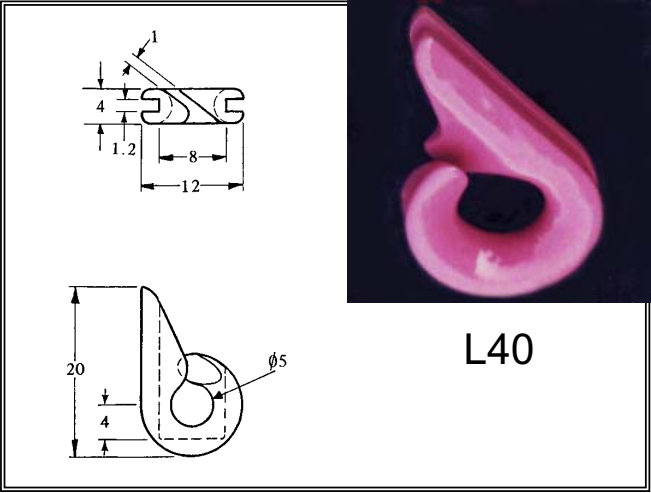
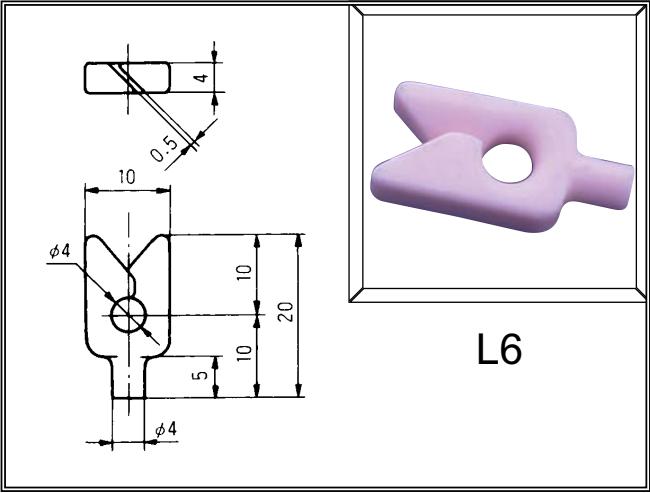
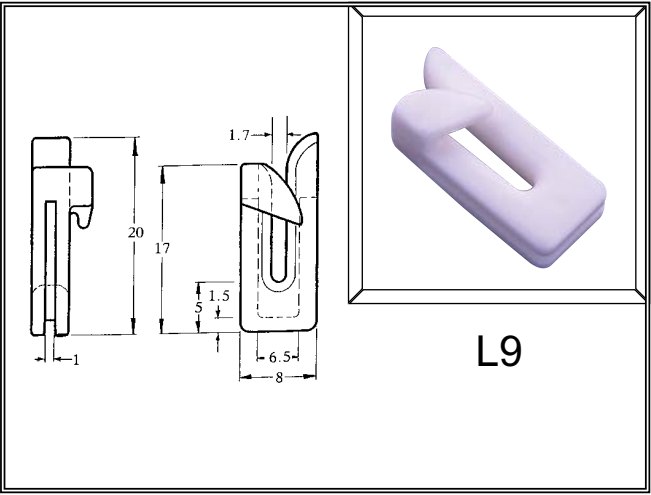
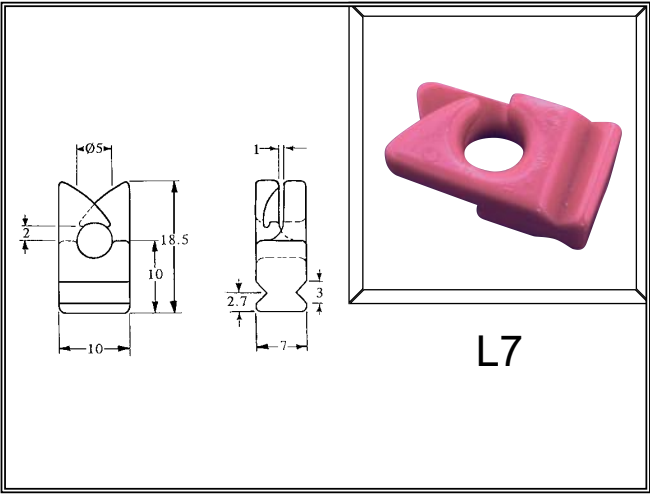
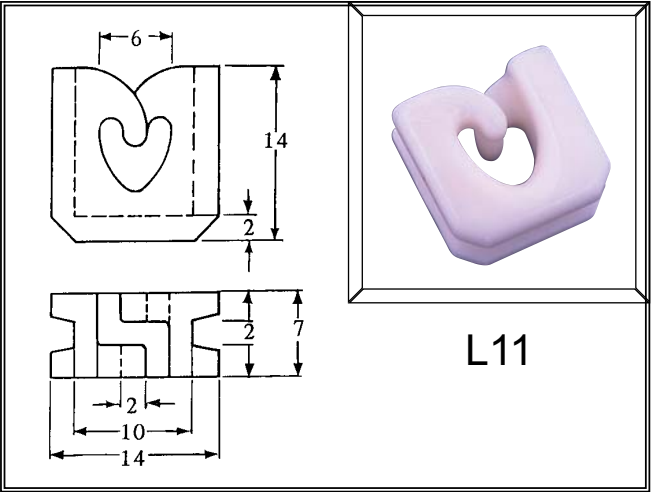
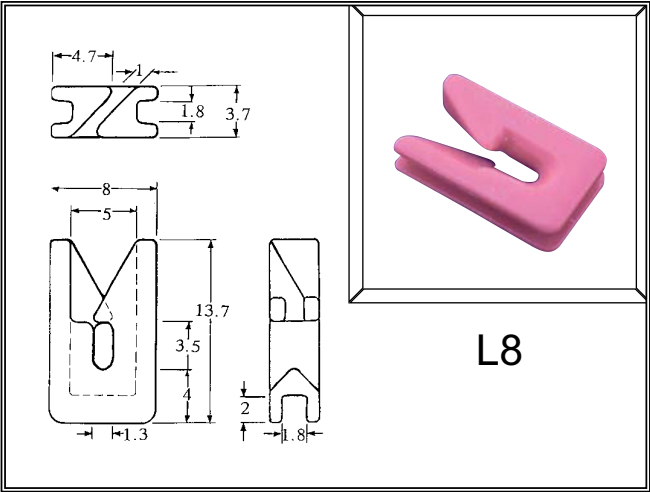
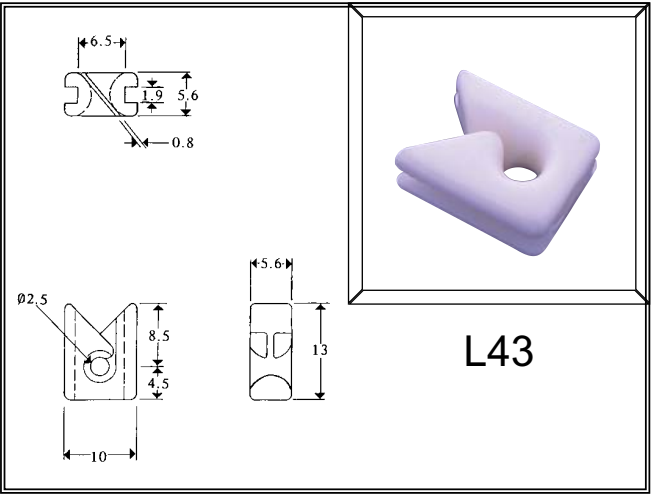
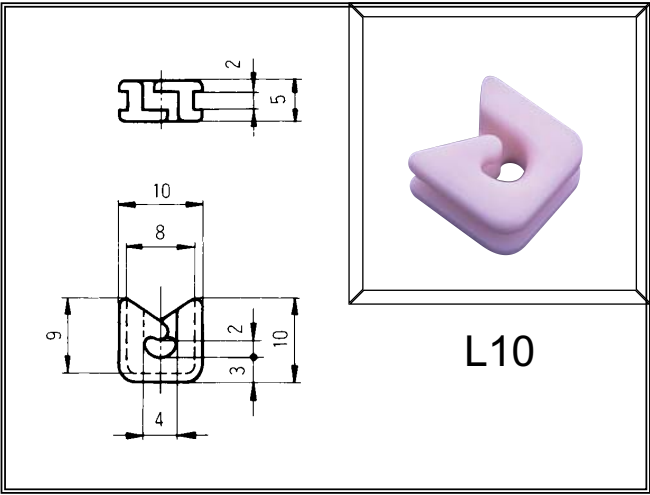
**K25**



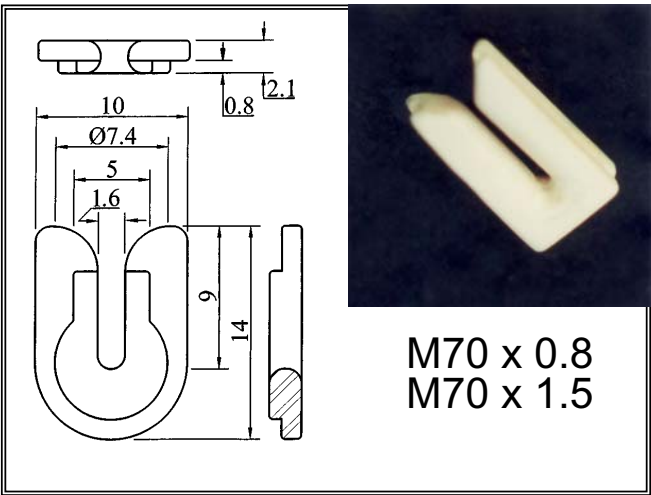
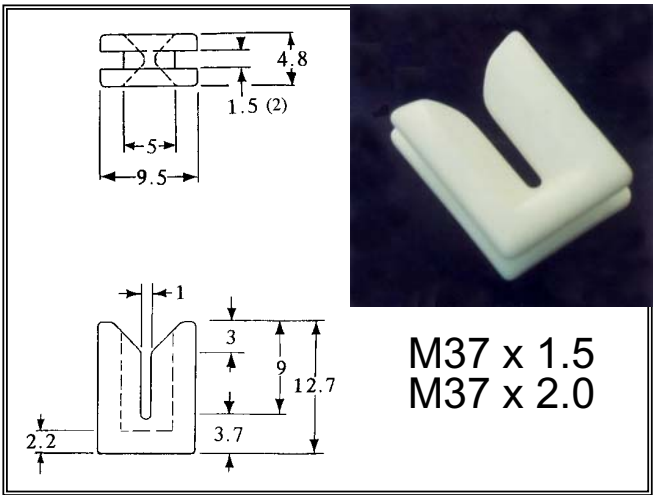
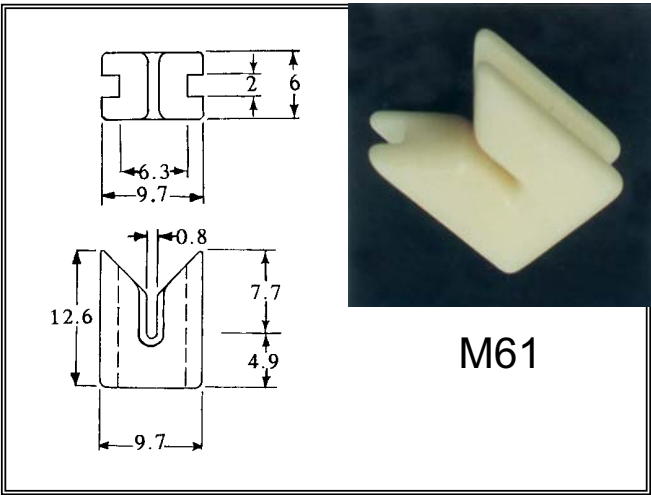
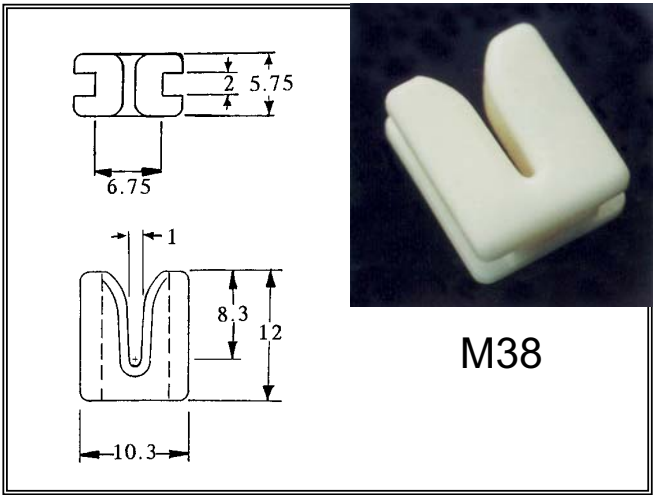
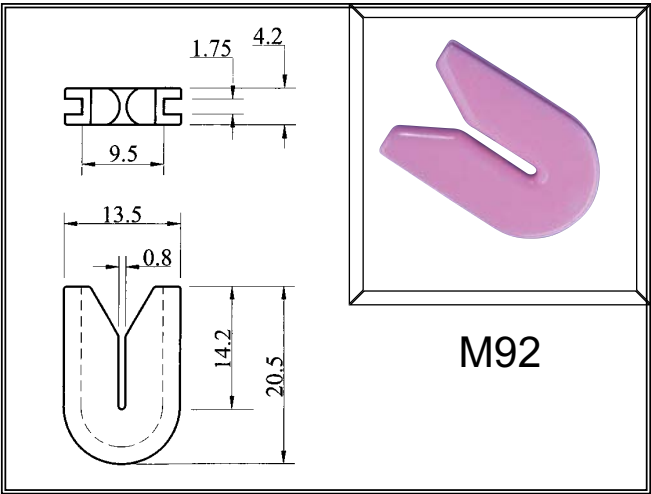
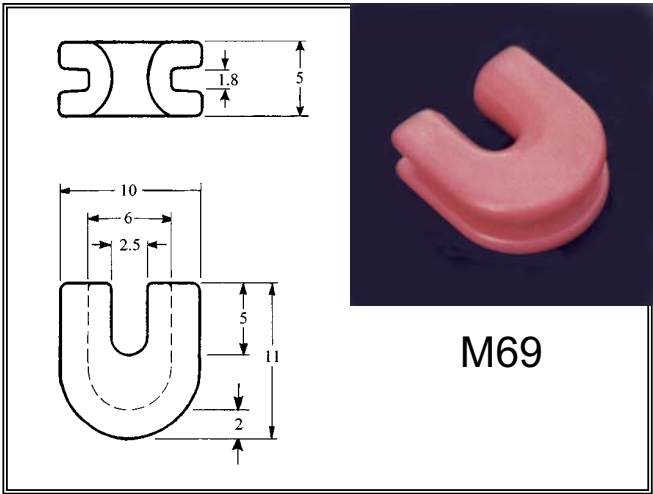
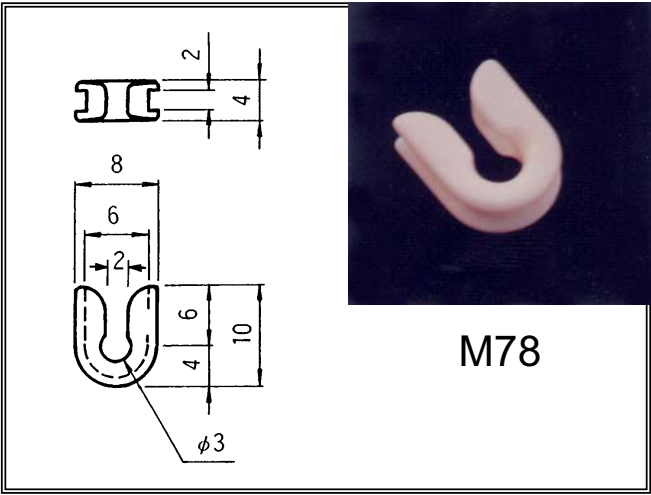
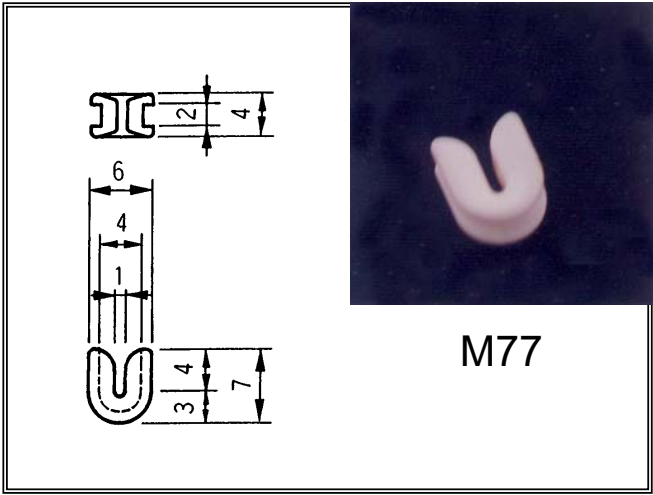


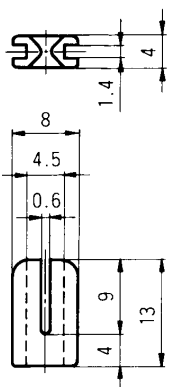




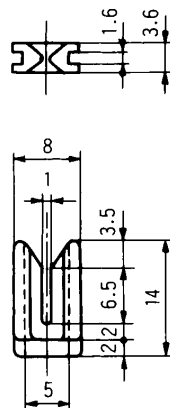




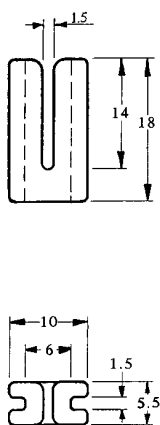




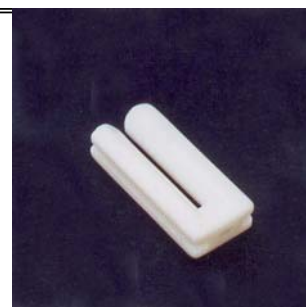
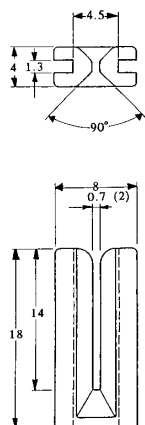
M32



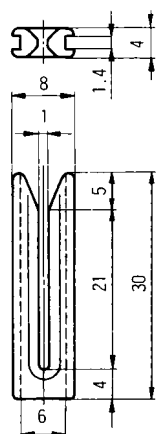
M22



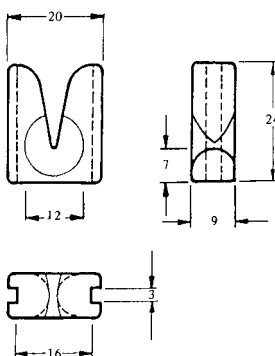
M73



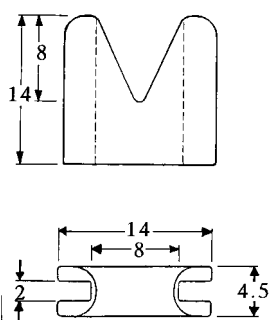
M63 x 0.7  
M63 x 2.0



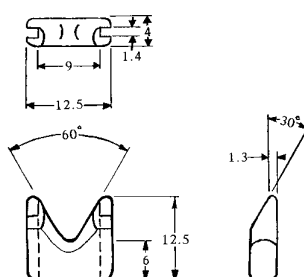
M56



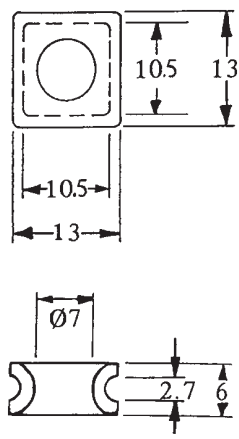
M49



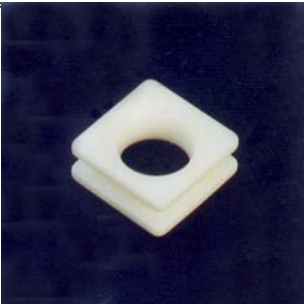
M44



M45



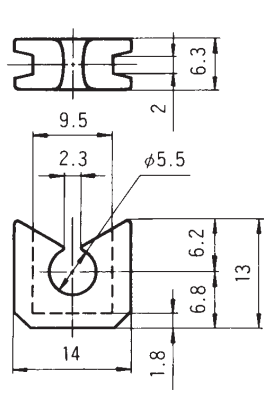
Technical drawing of F32 showing top, side, and cross-sectional views with dimensions: 10.5, 13, 10.5, 13, 7, 2.7, 6.



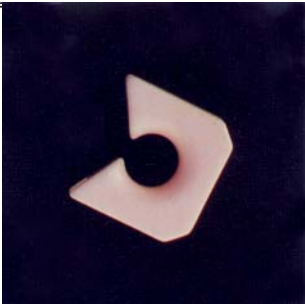
3D rendering of the F32 component, a white square ring.

**F32**

also available in PCS

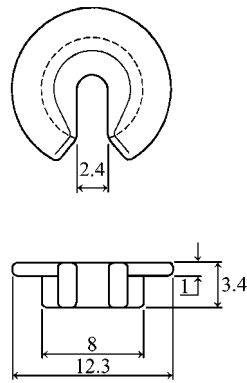


Technical drawing of M42 showing top, side, and cross-sectional views with dimensions: 6.3, 2, 9.5, 2.3, 5.5, 6.2, 13, 6.8, 1.8, 14.



3D rendering of the M42 component, a pink square ring.

**M42**

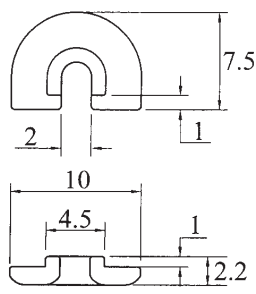


Technical drawing of M48 showing top, side, and cross-sectional views with dimensions: 2.4, 1, 3.4, 8, 12.3.



3D rendering of the M48 component, a white circular ring.

**M48**

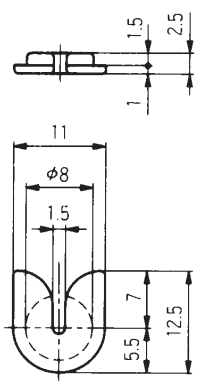


Technical drawing of H1 showing top, side, and cross-sectional views with dimensions: 7.5, 2, 1, 10, 4.5, 1, 2.2.



3D rendering of the H1 component, a white semi-circular ring.

**H1**

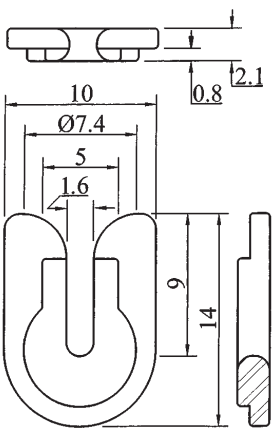


Technical drawing of L57 showing top, side, and cross-sectional views with dimensions: 1.5, 2.5, 1, 11, 8, 1.5, 7, 12.5, 5.5.

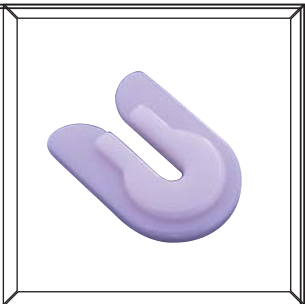


3D rendering of the L57 component, a purple U-shaped ring.

**L57**

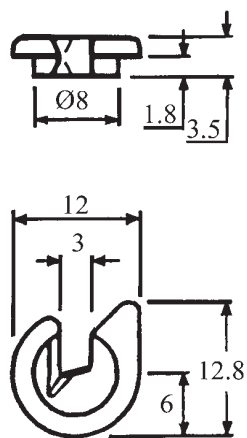


Technical drawing of M90 showing top, side, and cross-sectional views with dimensions: 1, 2.1, 0.8, 10, 7.4, 5, 1.6, 9, 14.



3D rendering of the M90 component, a purple U-shaped ring.

**M90**



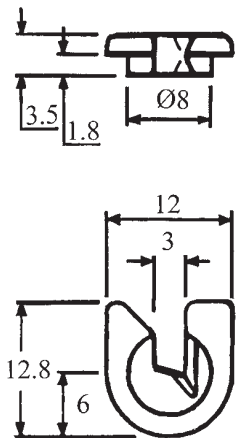
Technical drawing of M88 showing top, side, and cross-sectional views with dimensions: 12, 3, 12.8, 6, 8, 1.8, 3.5.



3D rendering of the M88 component, a purple U-shaped ring.

**M88**

also available in PCS

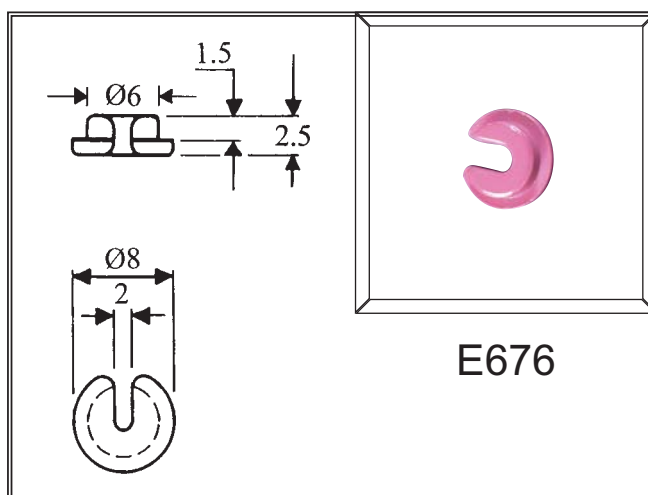
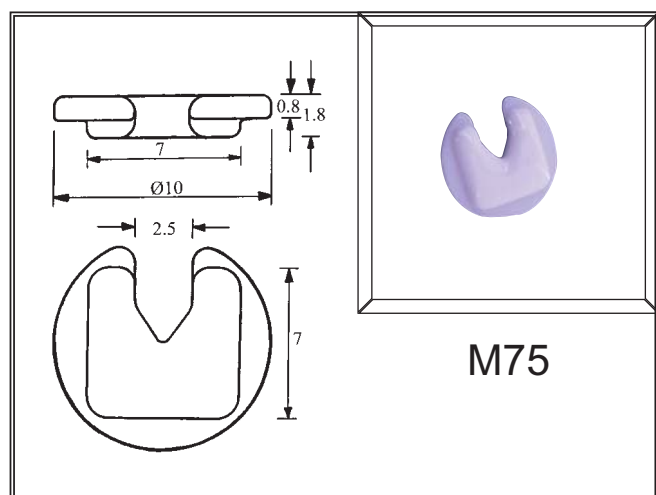
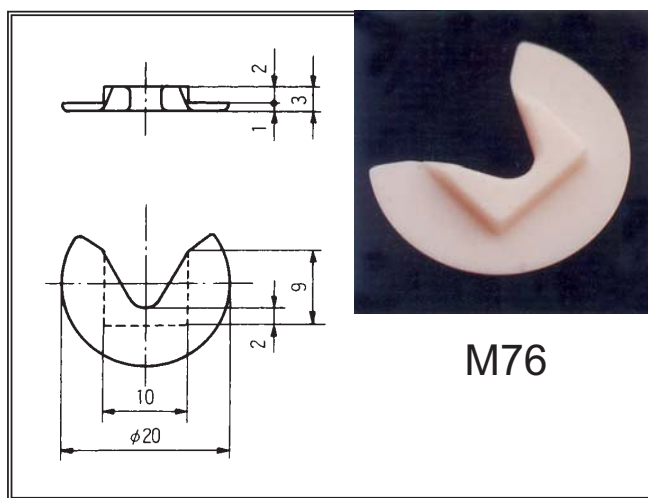
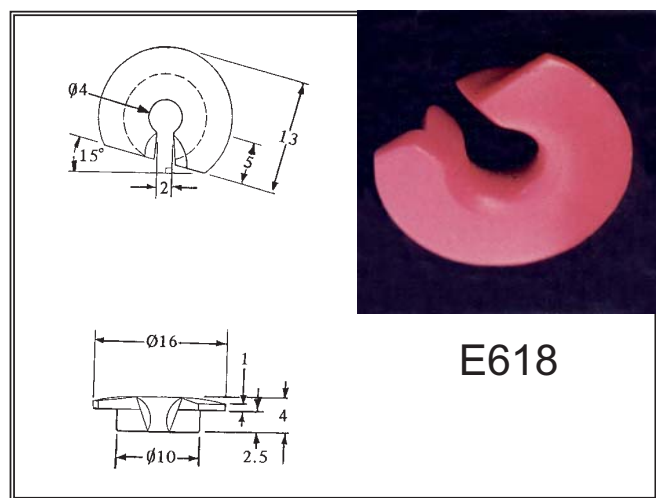
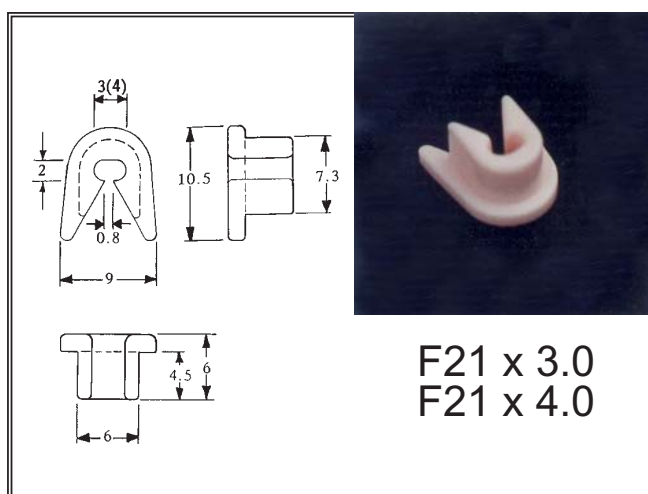
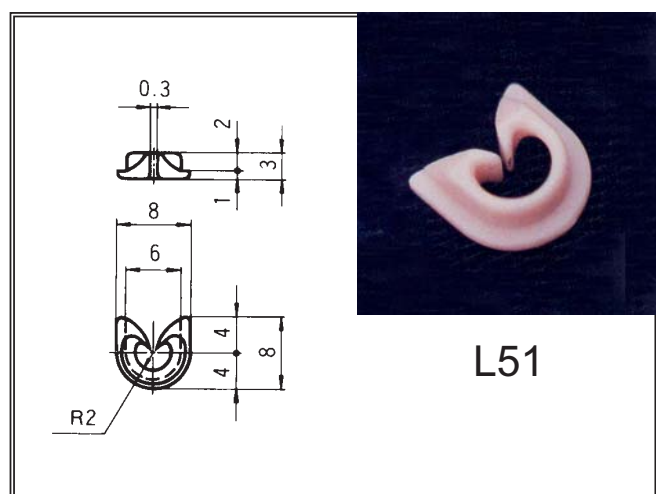
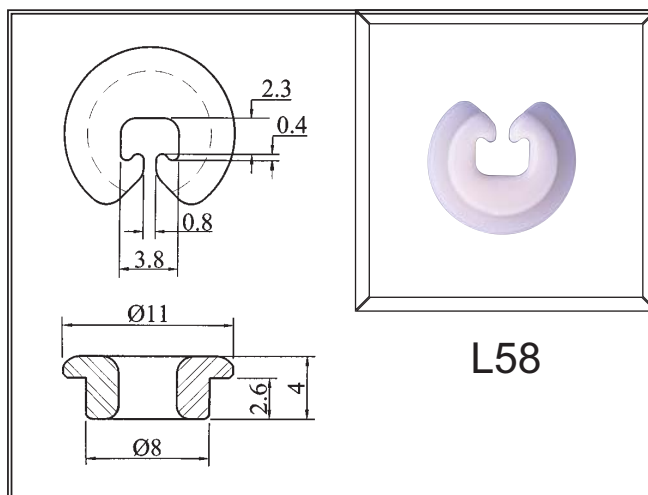
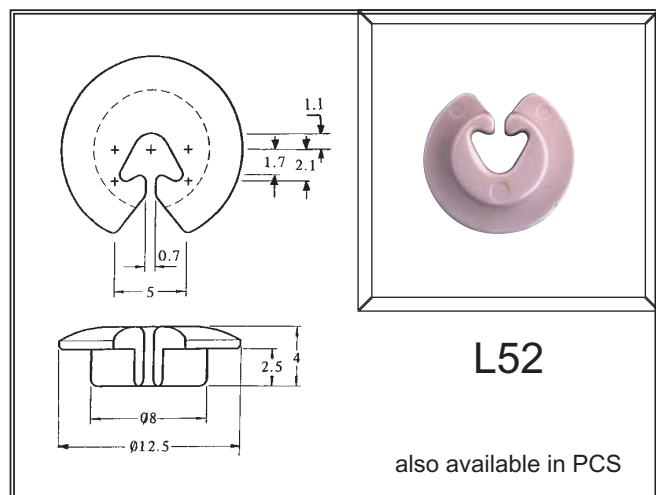


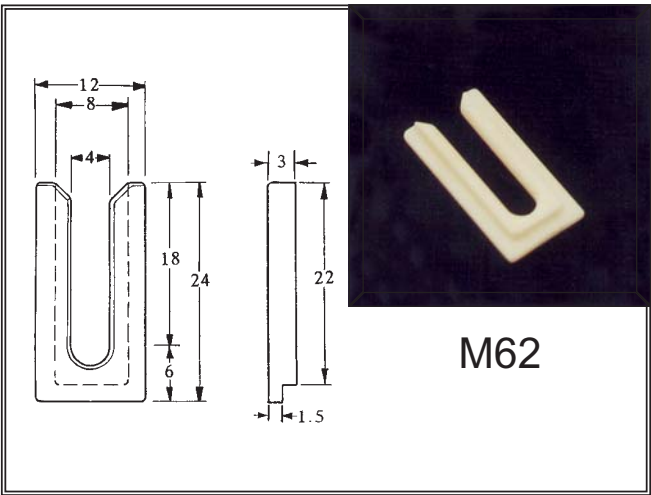
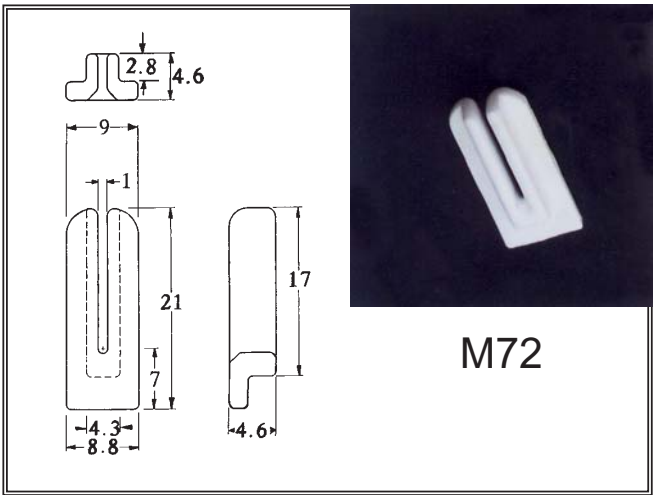
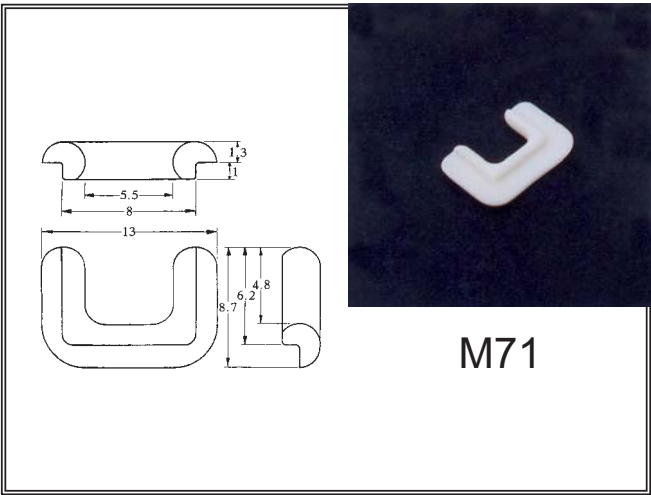
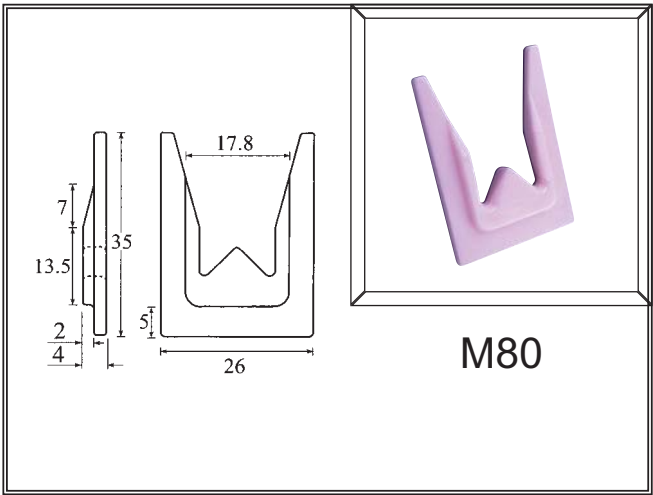
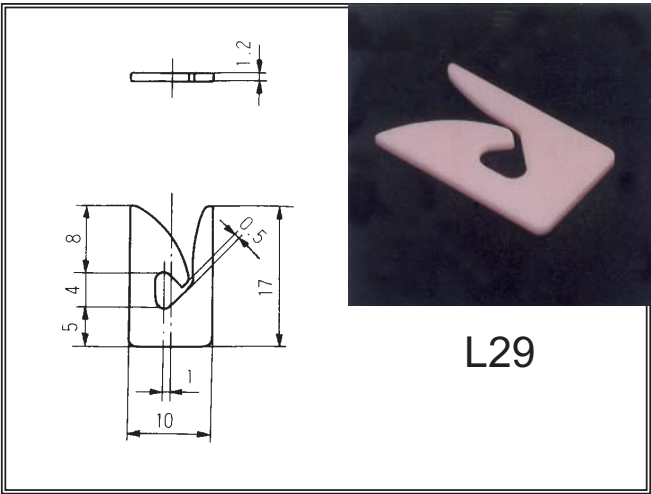
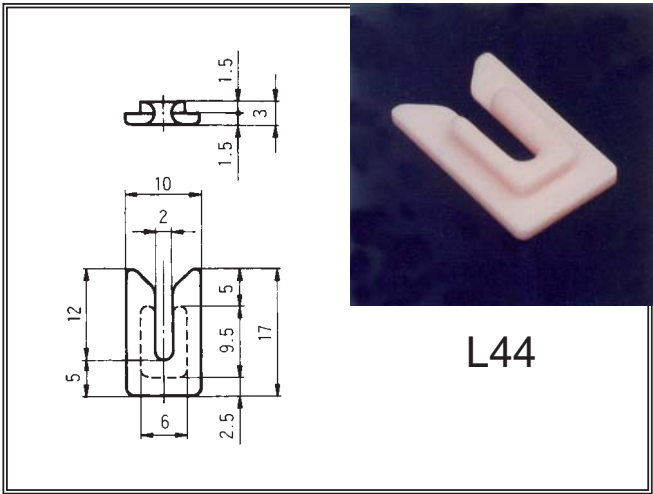
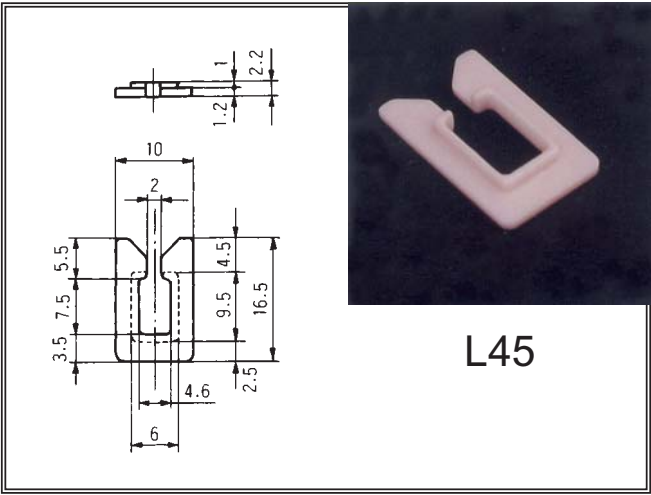
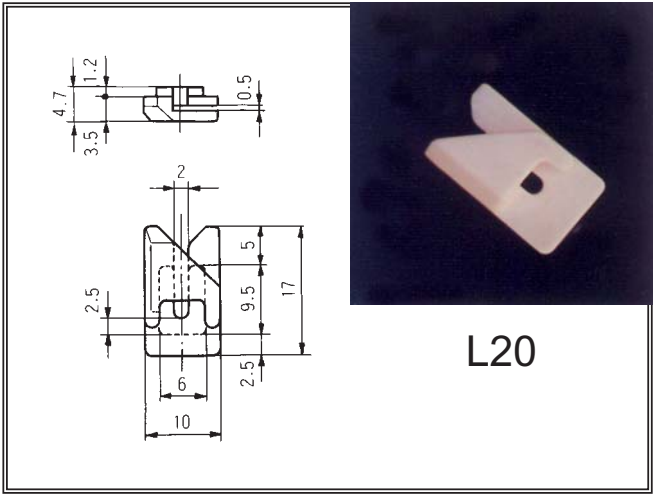
Technical drawing of M89 showing top, side, and cross-sectional views with dimensions: 12, 3, 12.8, 6, 8, 1.8, 3.5.



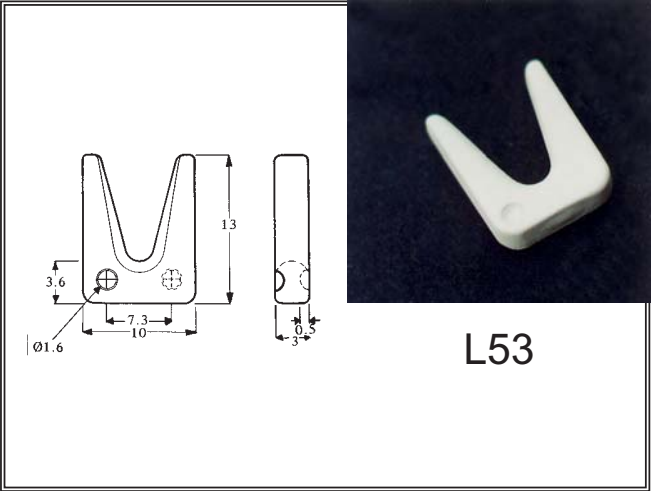
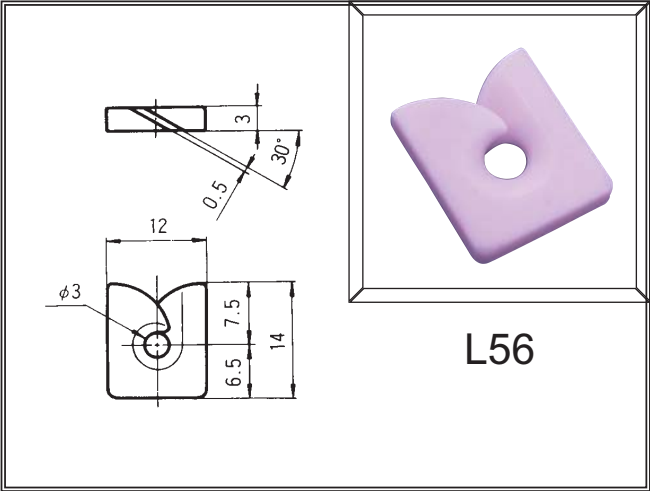
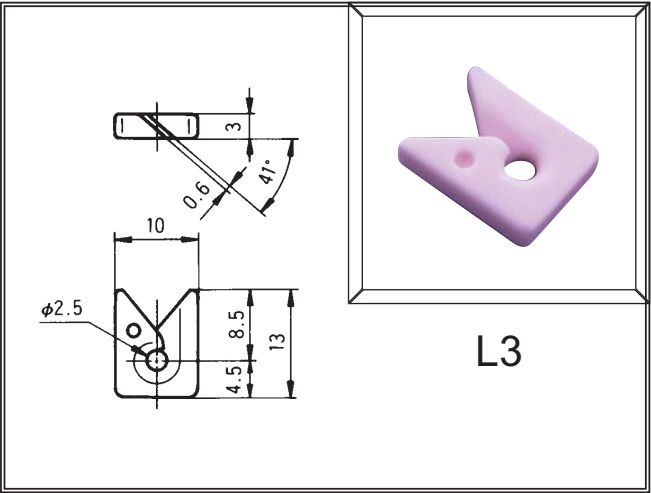
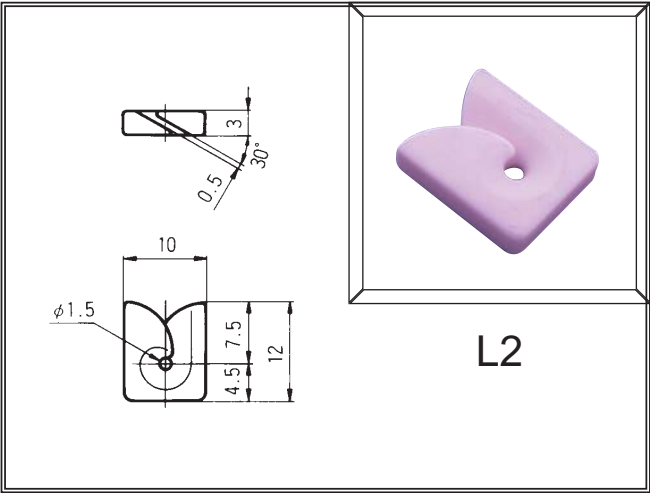
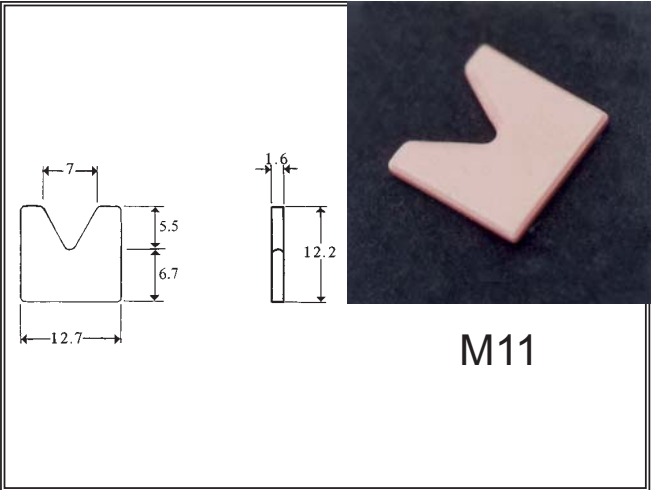
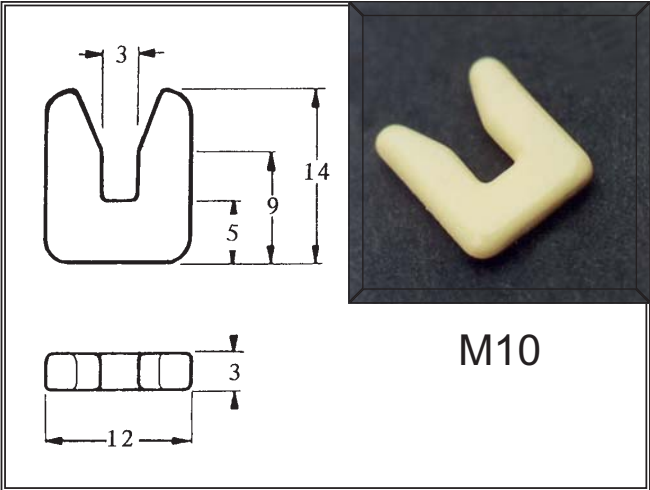
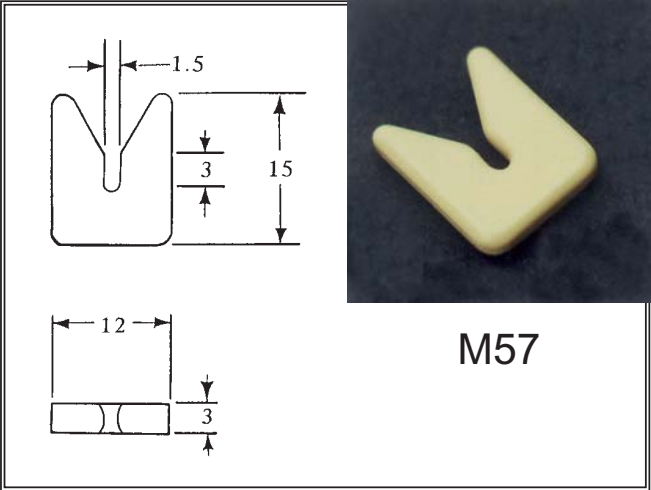
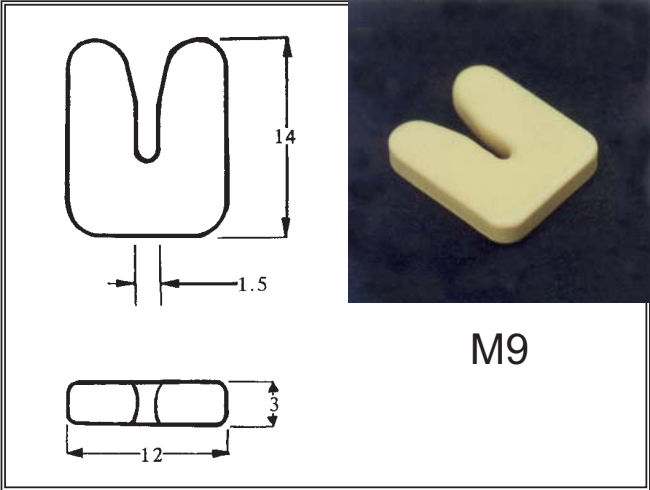
3D rendering of the M89 component, a pink U-shaped ring.

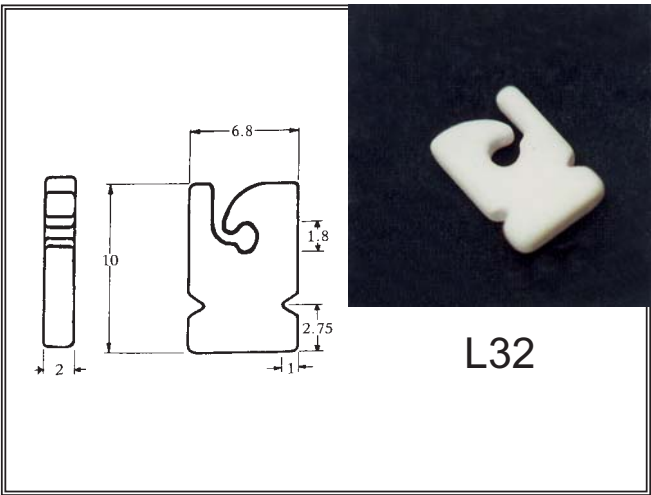
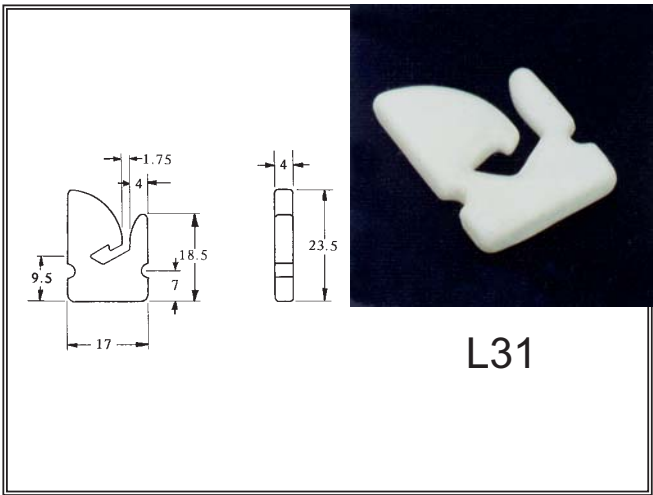
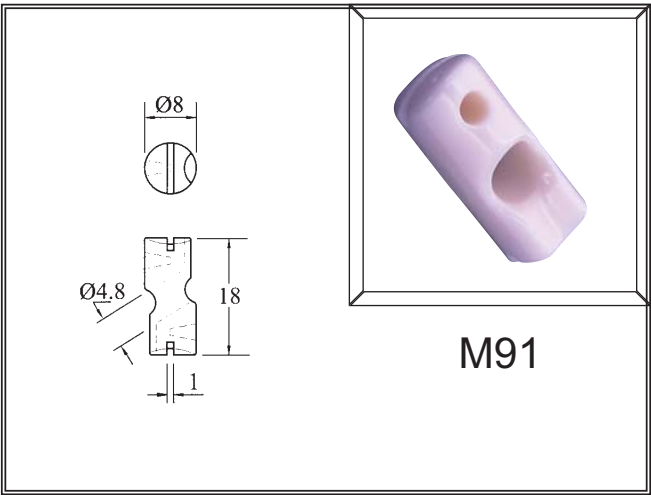
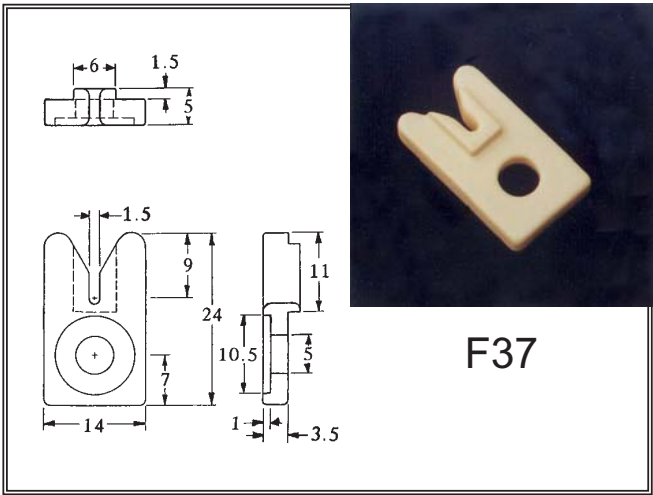
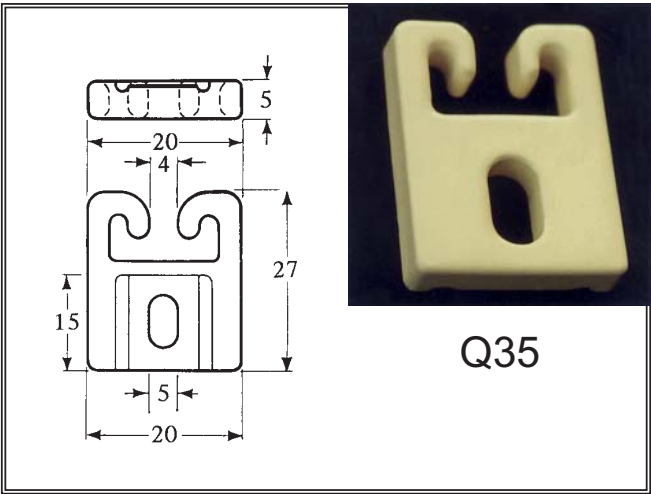
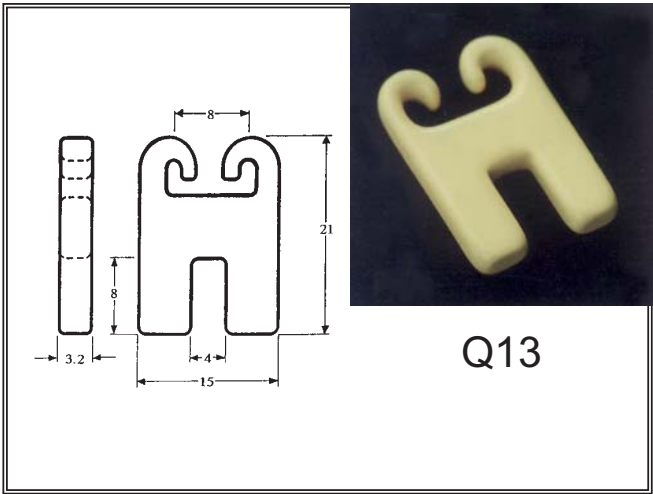
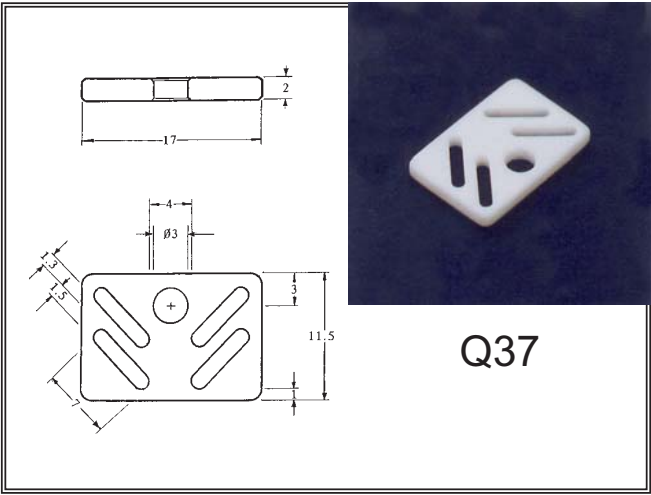
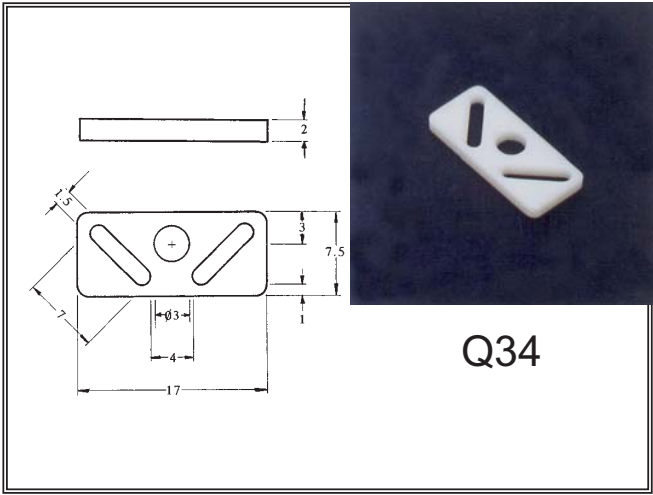
**M89**

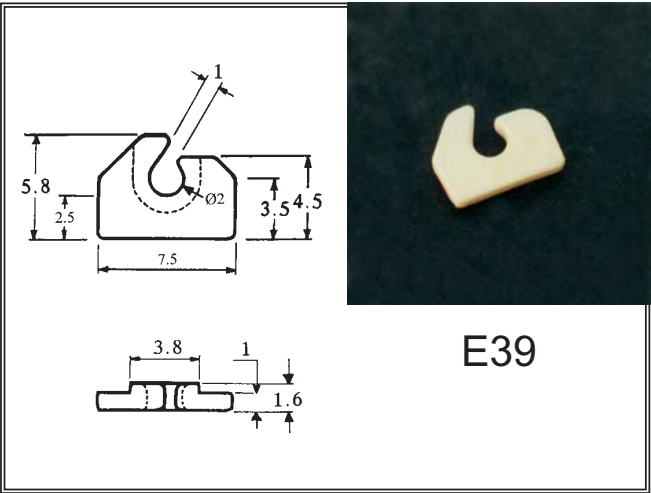
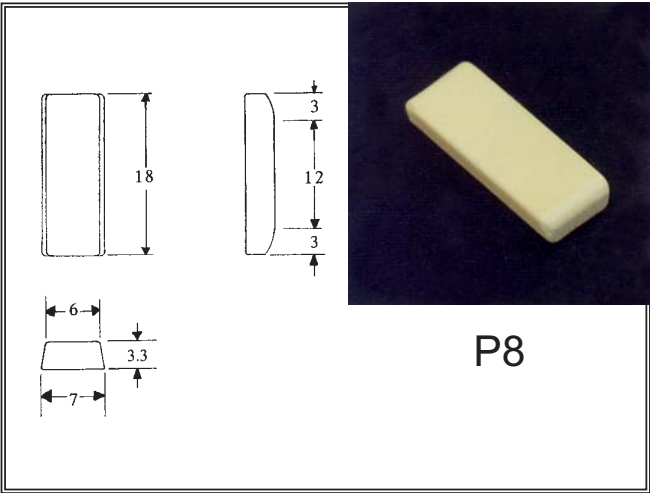
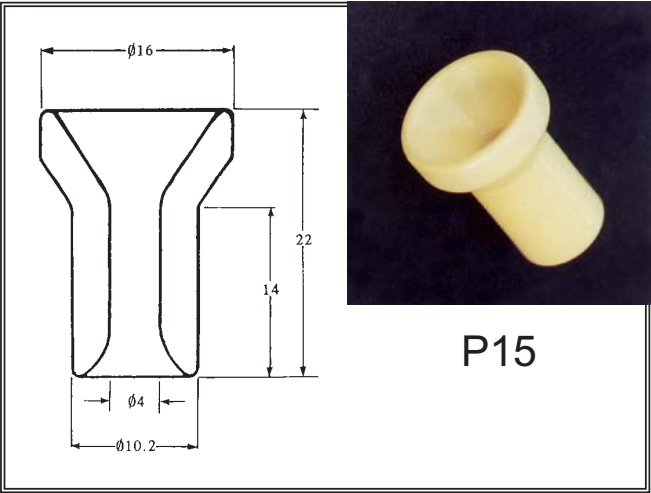
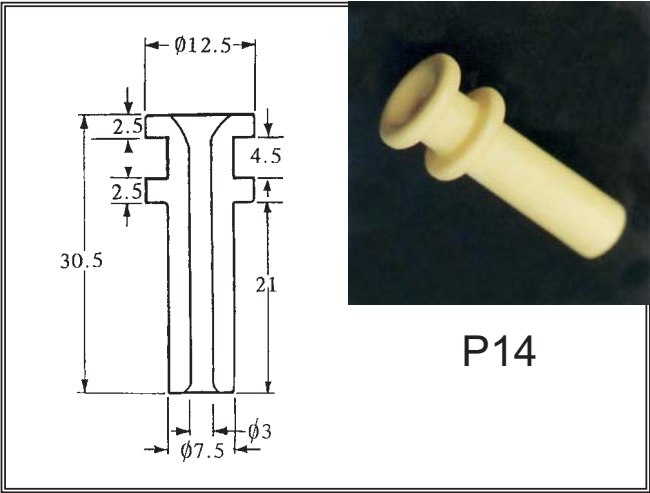
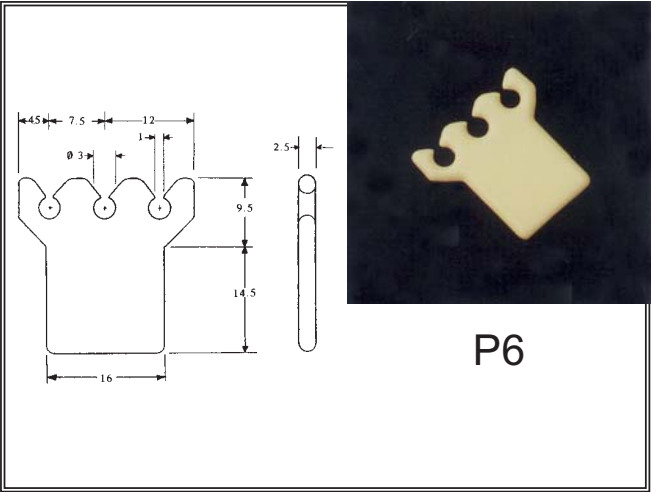
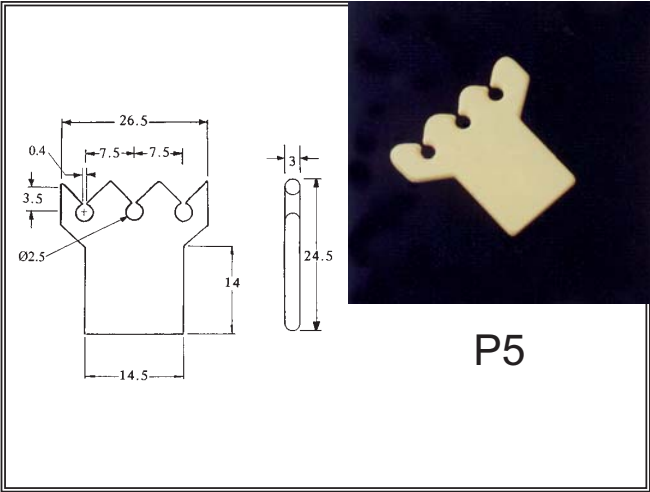
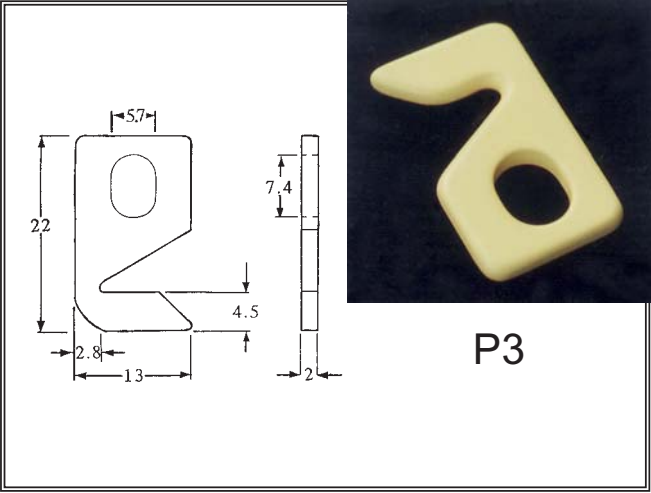
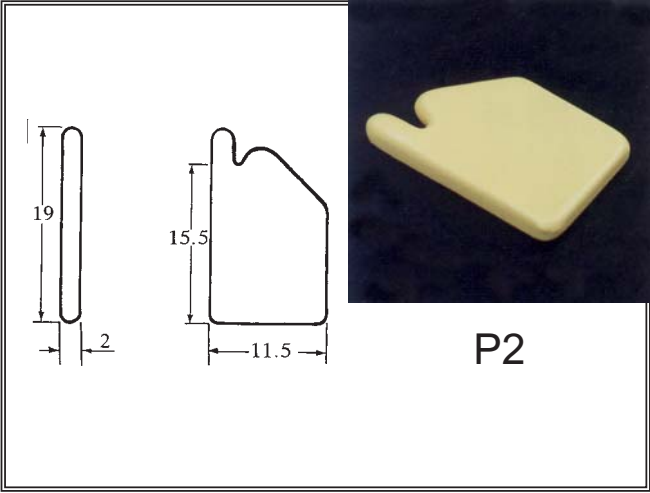


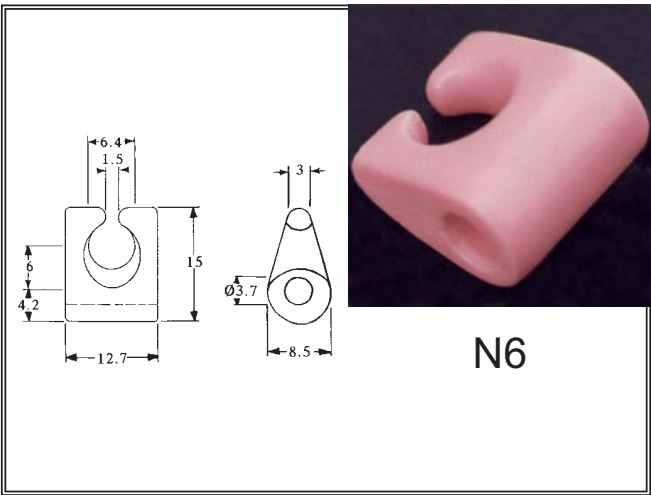
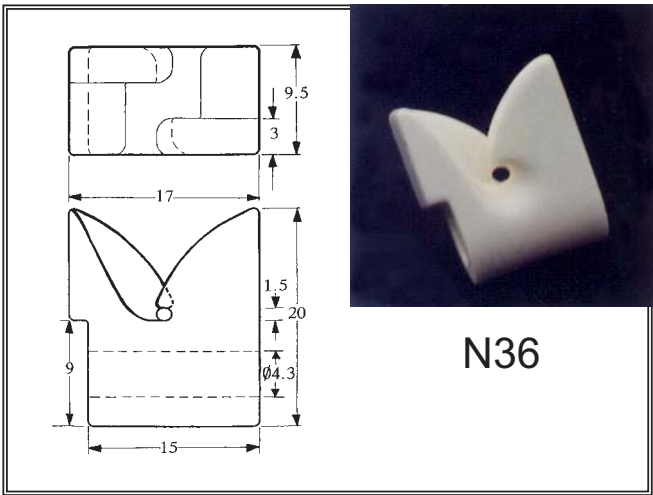
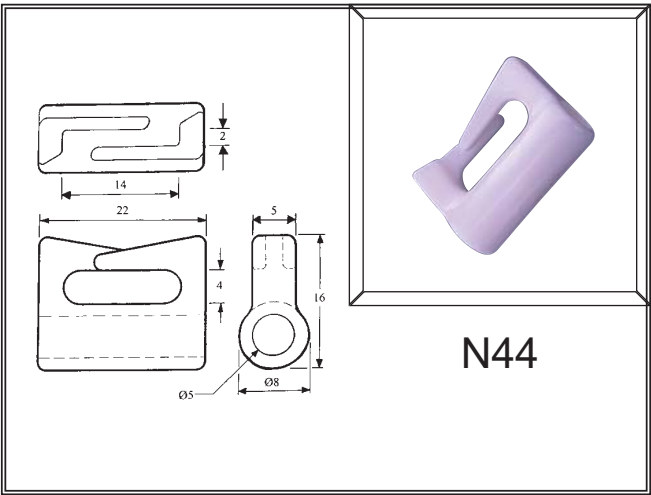
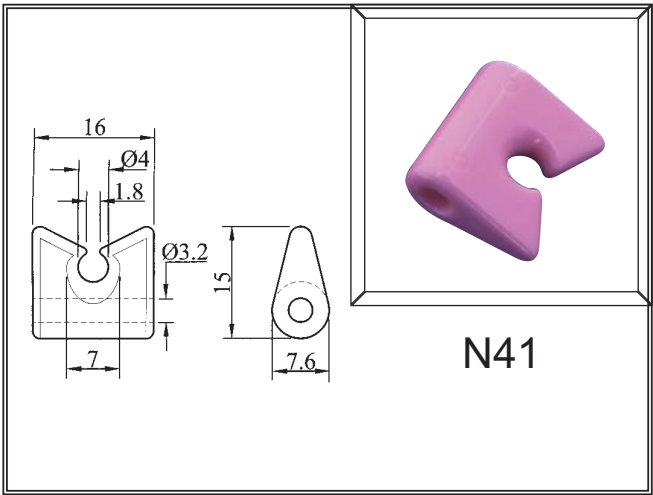
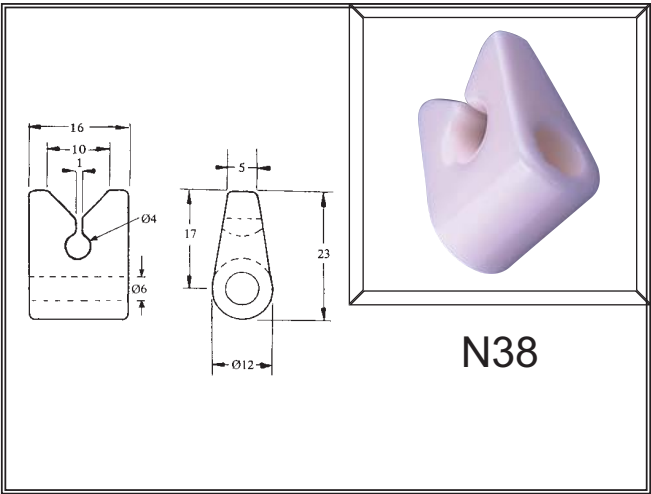
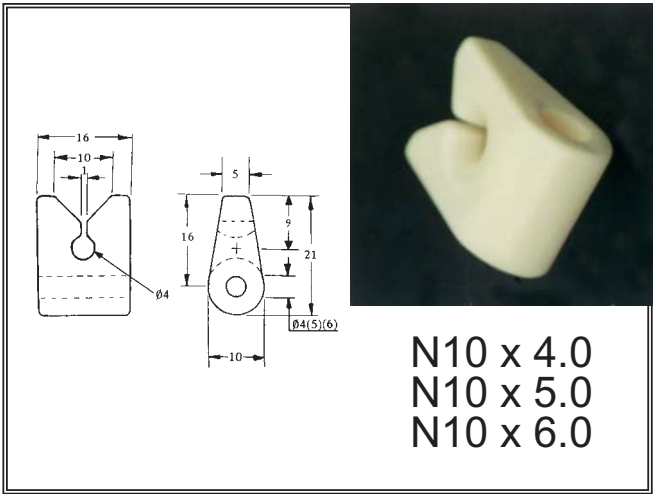
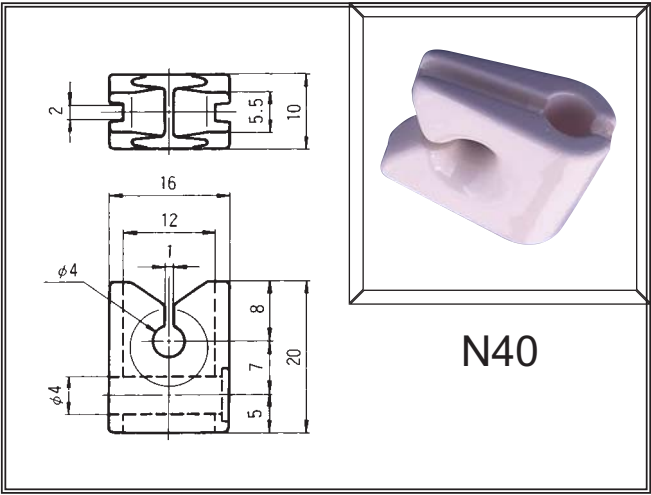
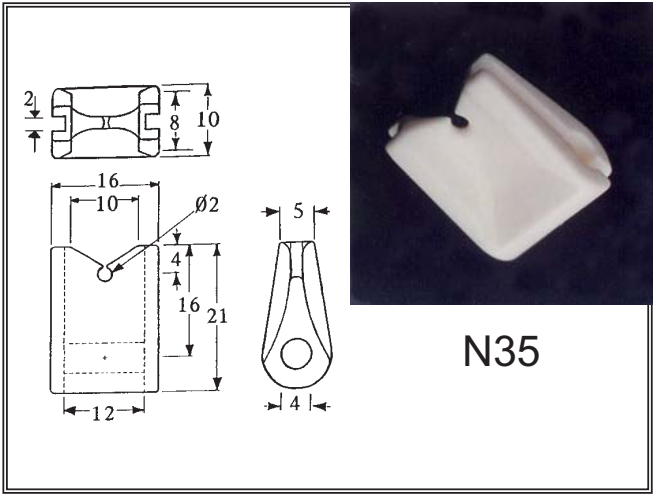














N1



N3



N14 x 3.3  
N14 x 5.0



N31



N18



N39

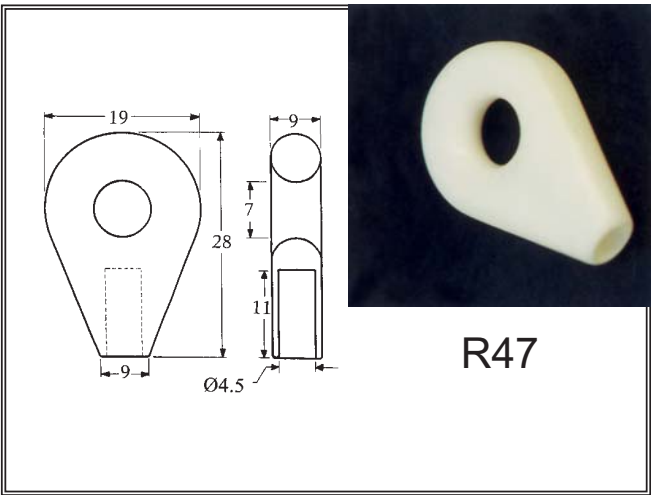
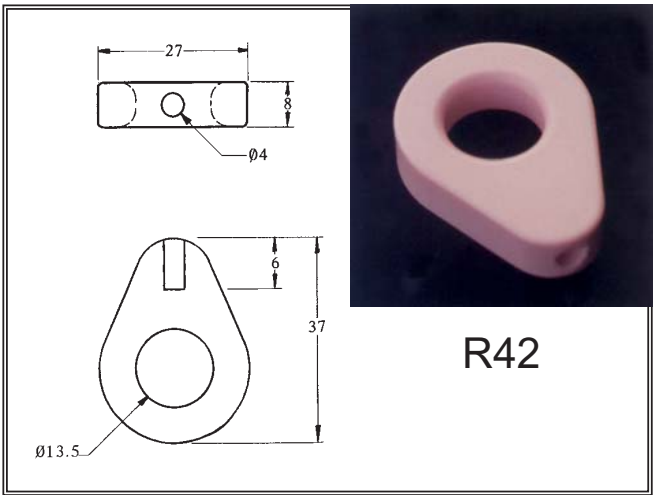
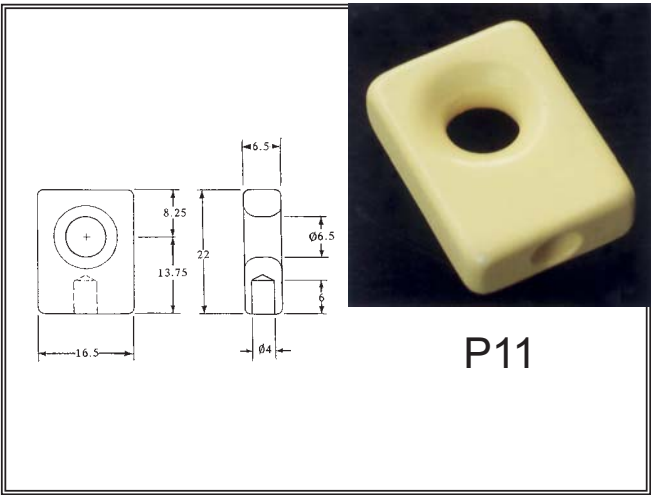
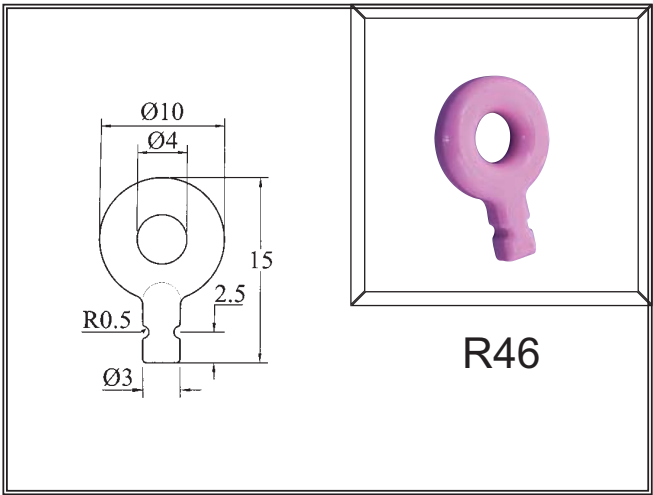
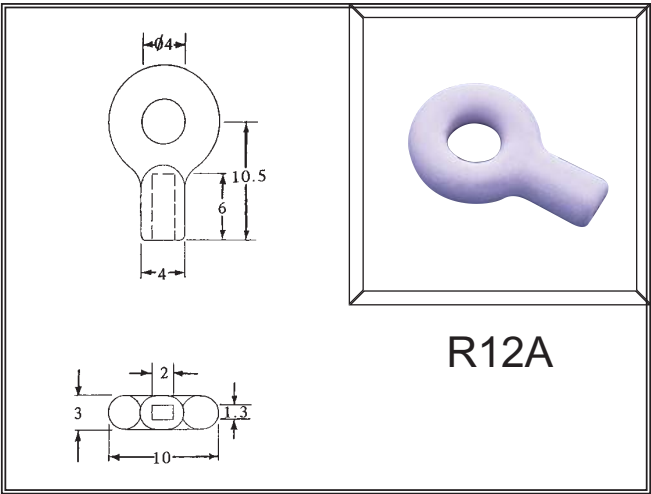
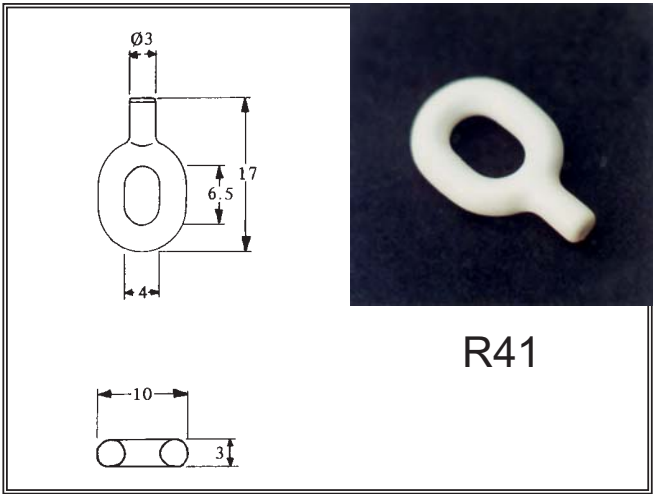
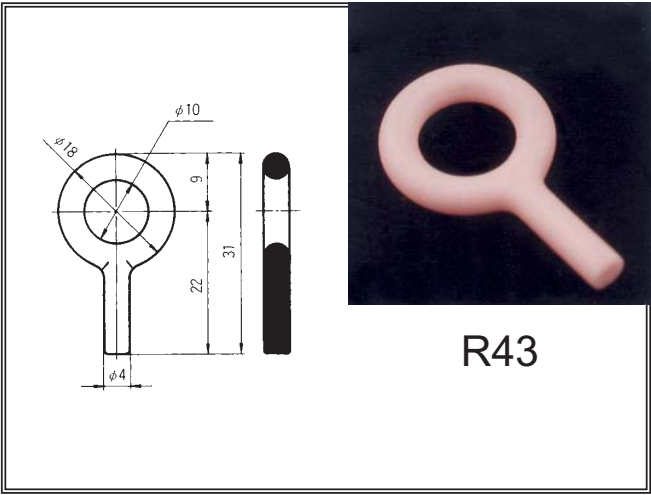
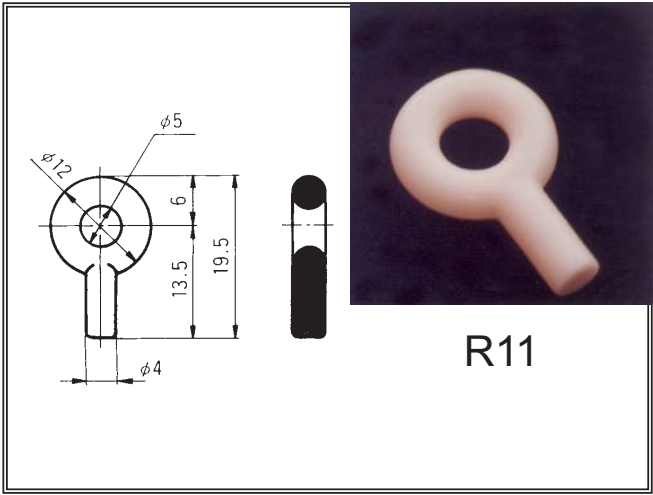


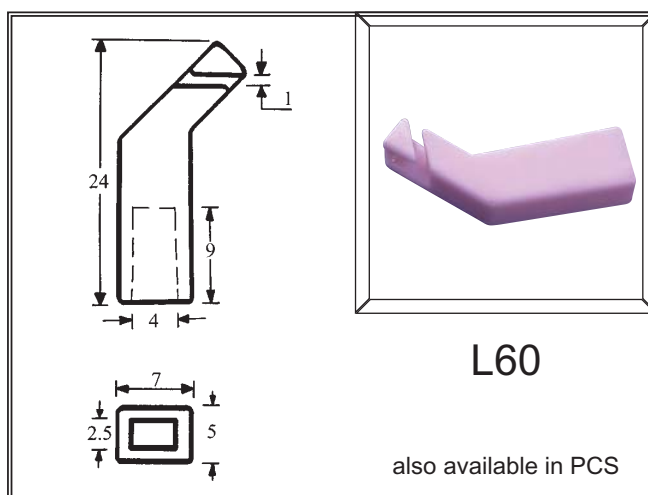
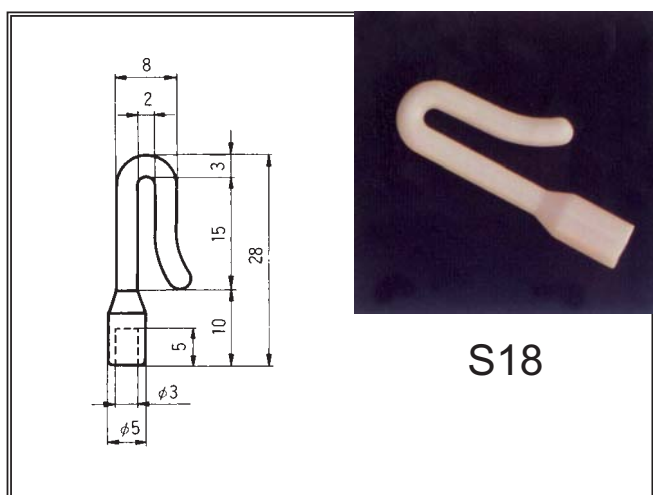
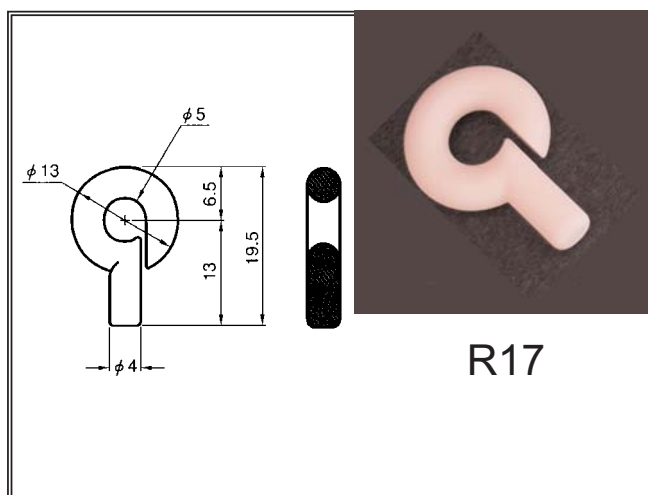
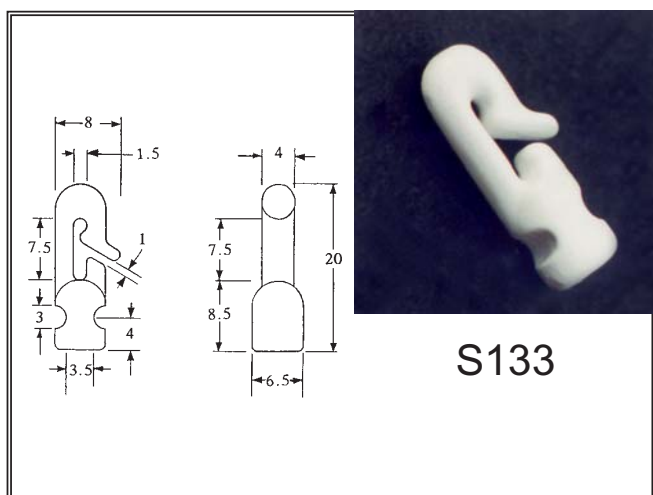
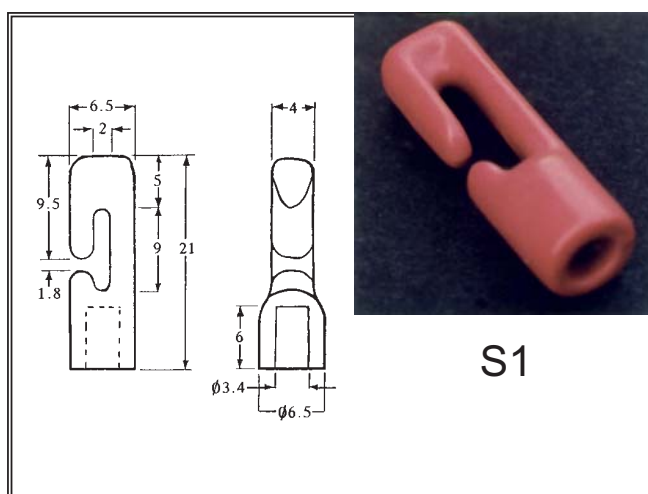
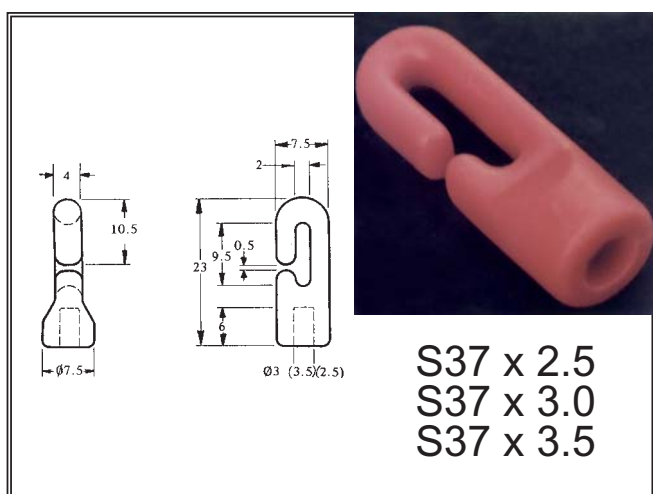
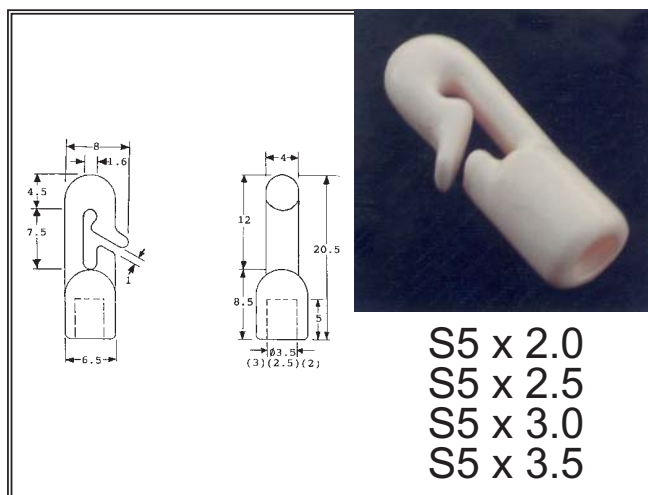
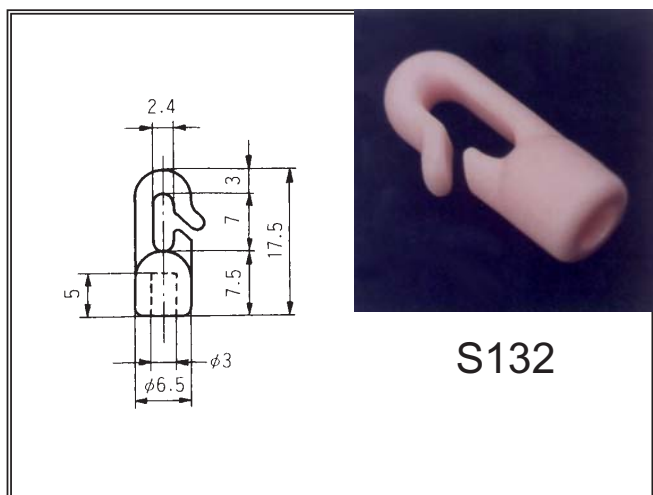
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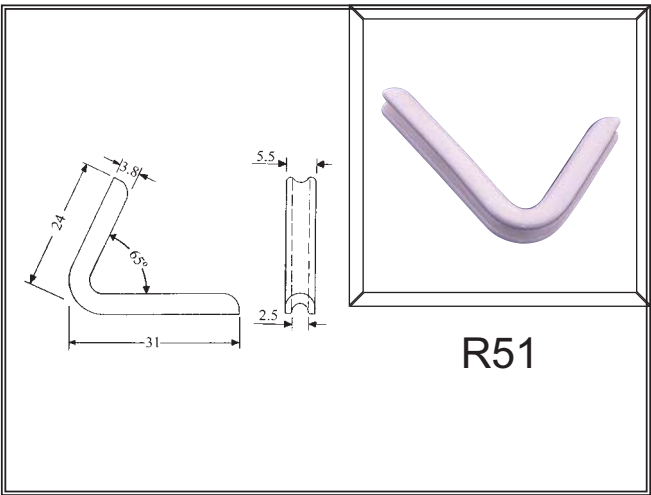
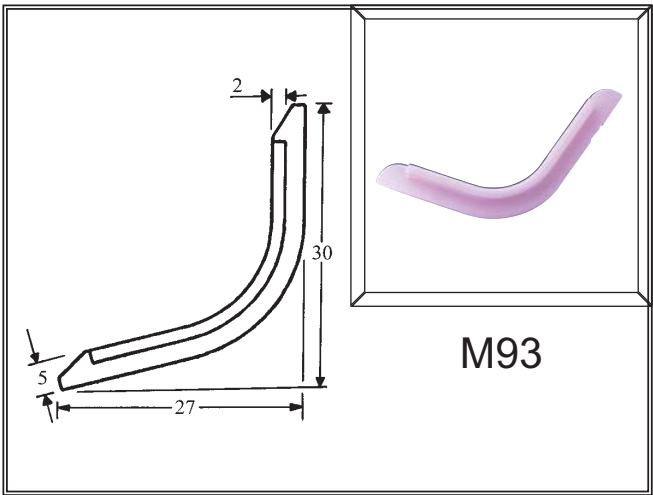
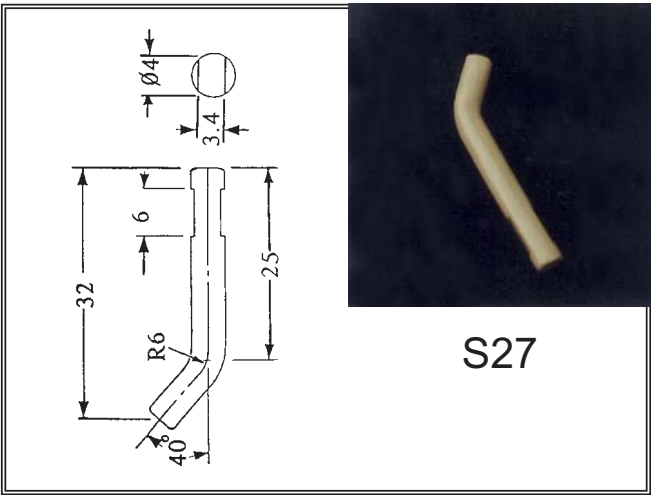
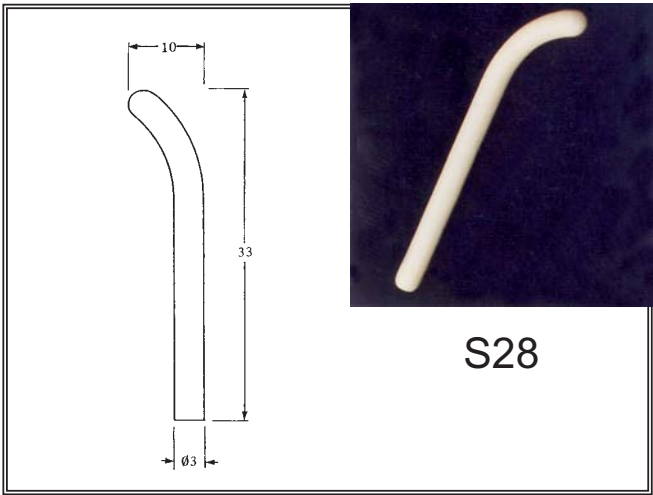
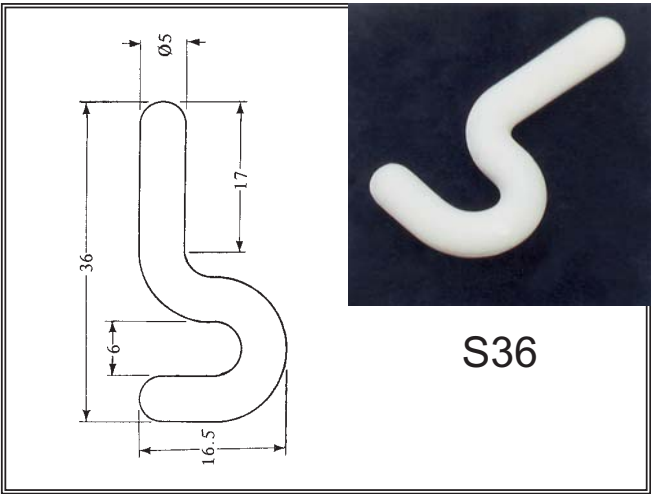
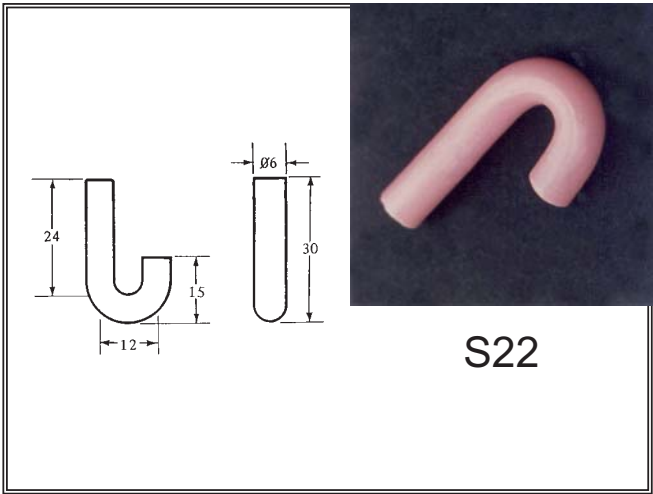
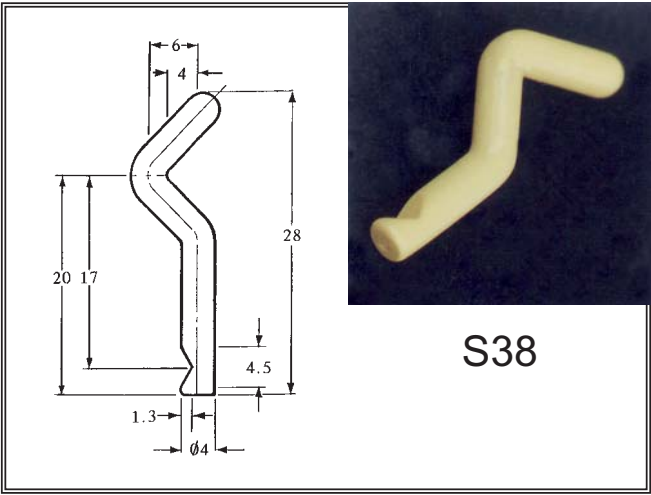
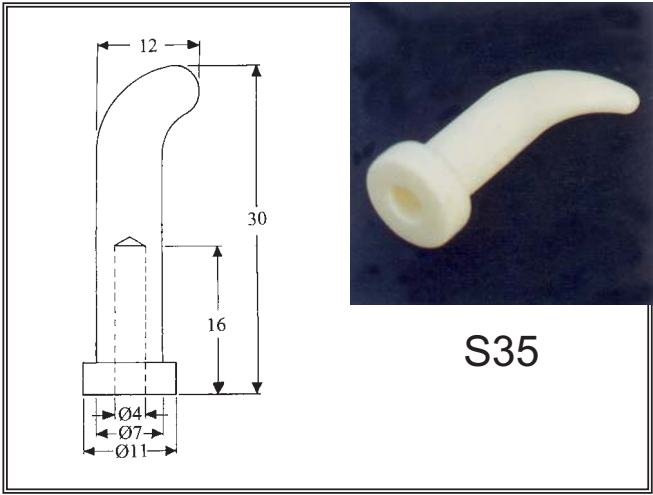


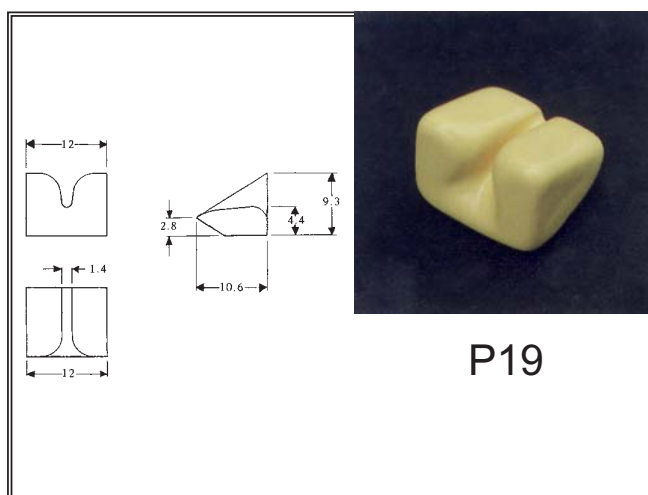
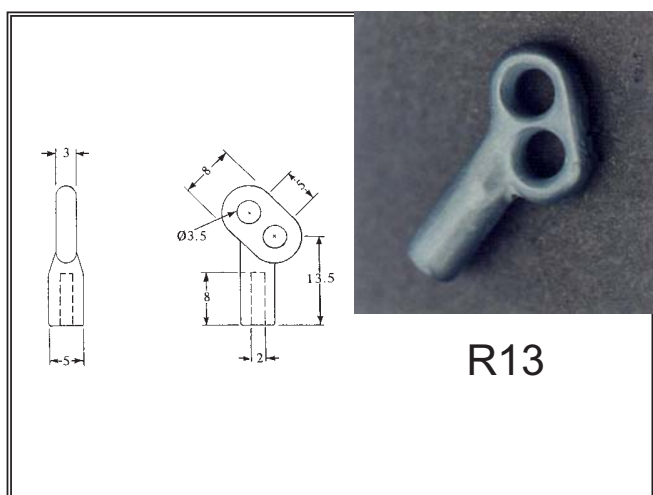
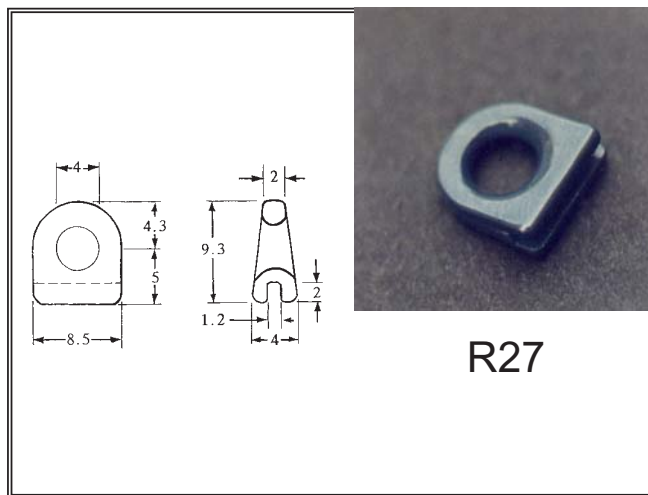
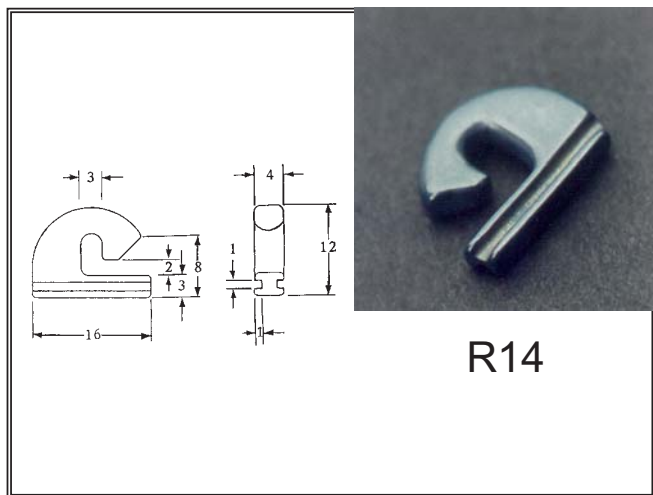
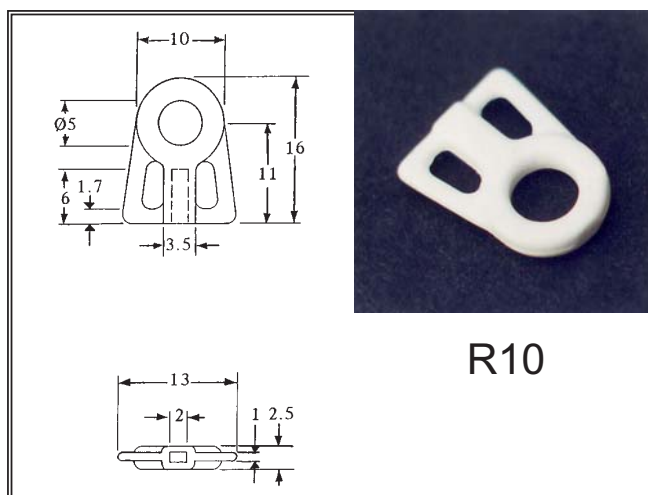
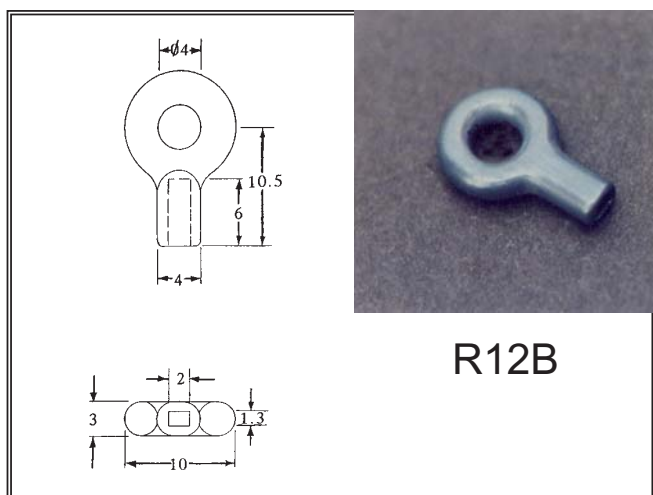
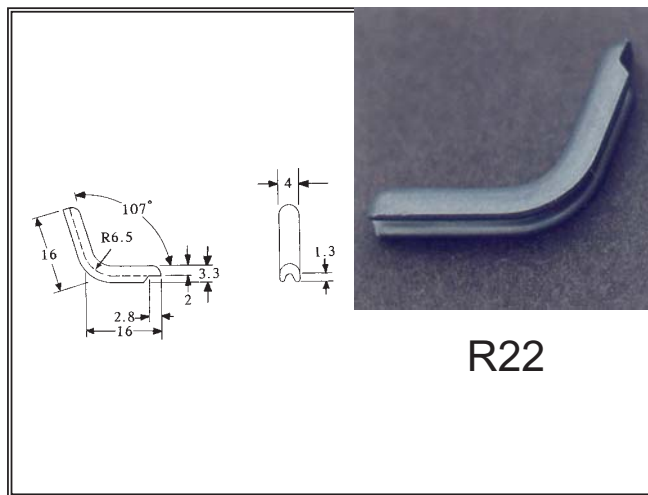
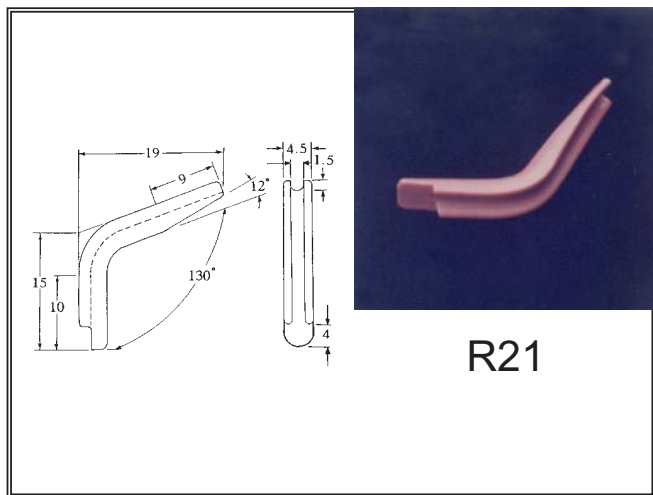
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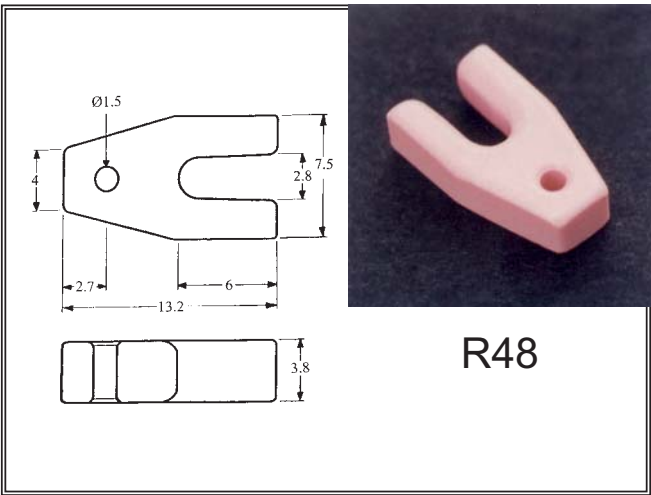
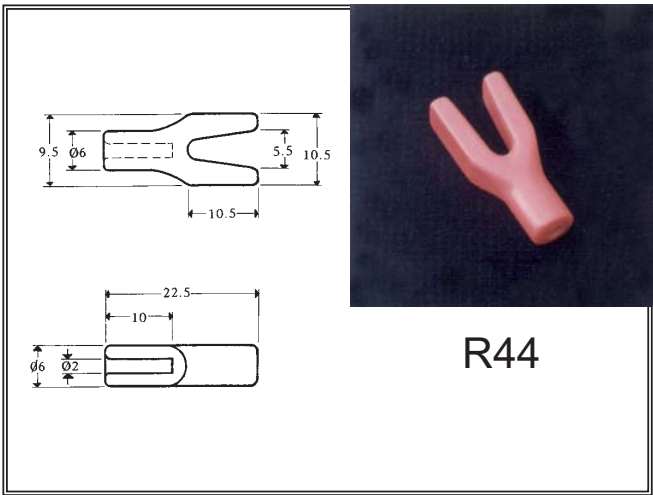
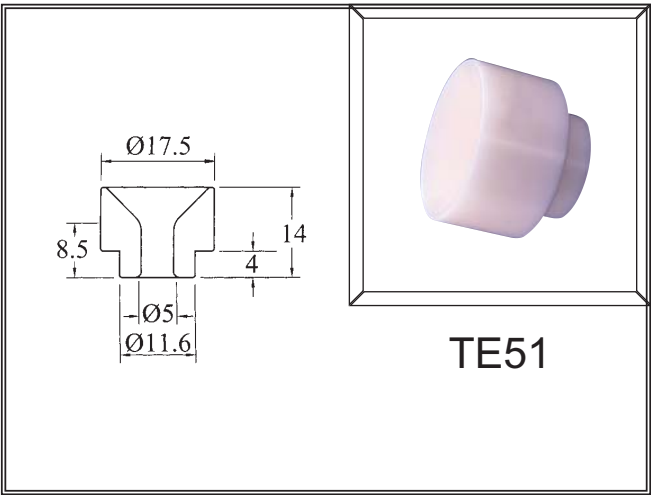
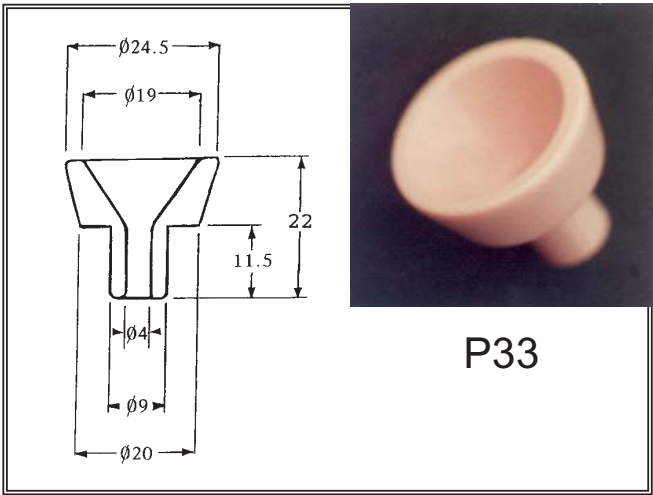
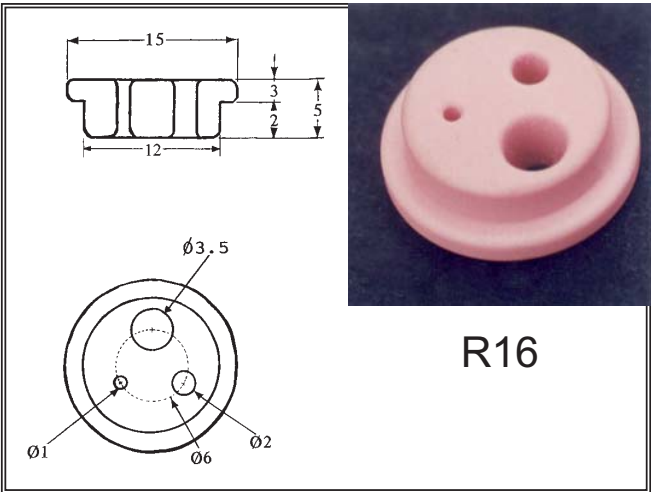
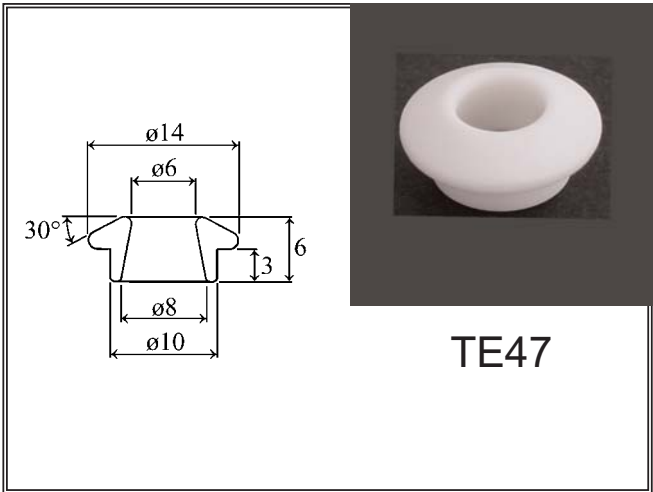
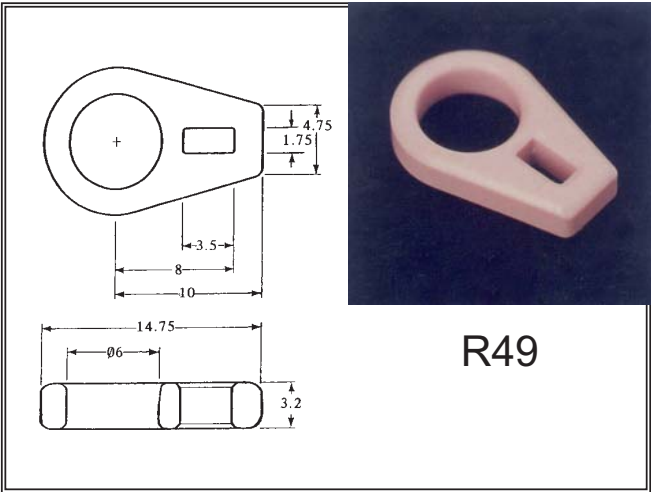
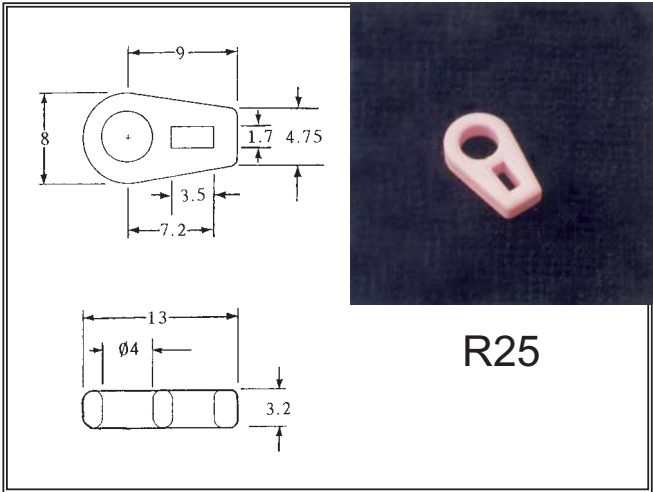




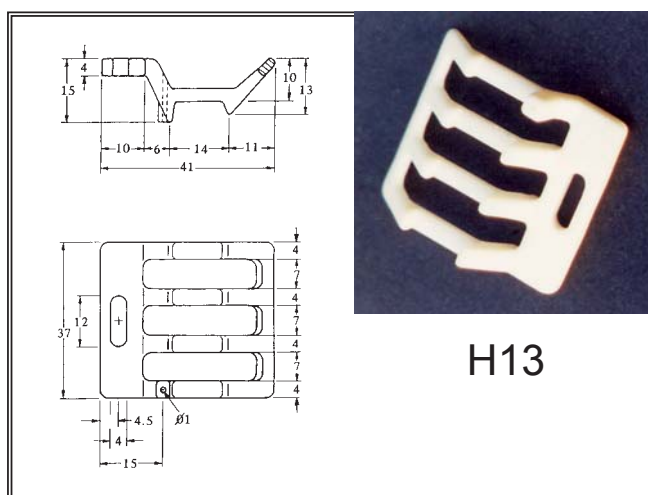
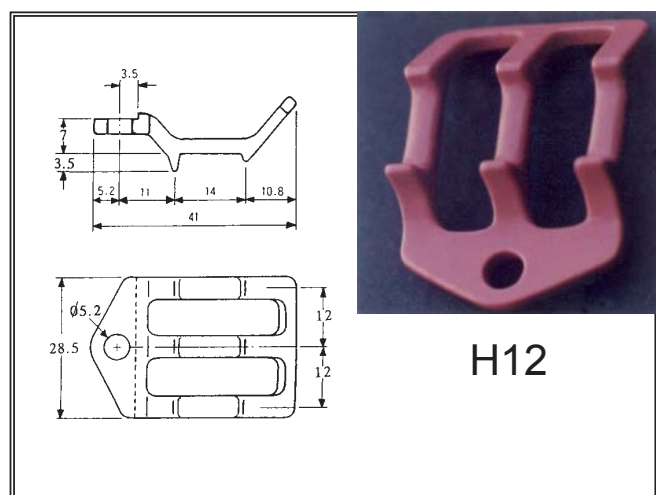
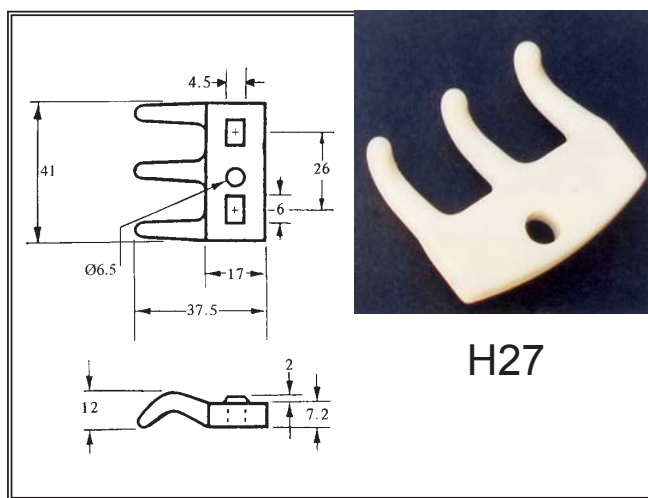
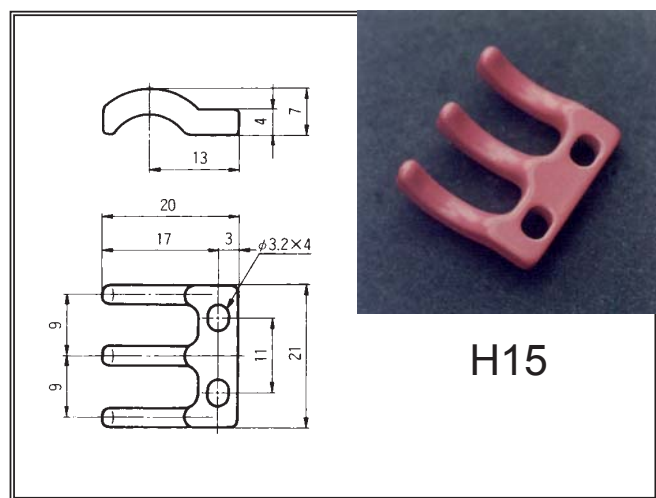
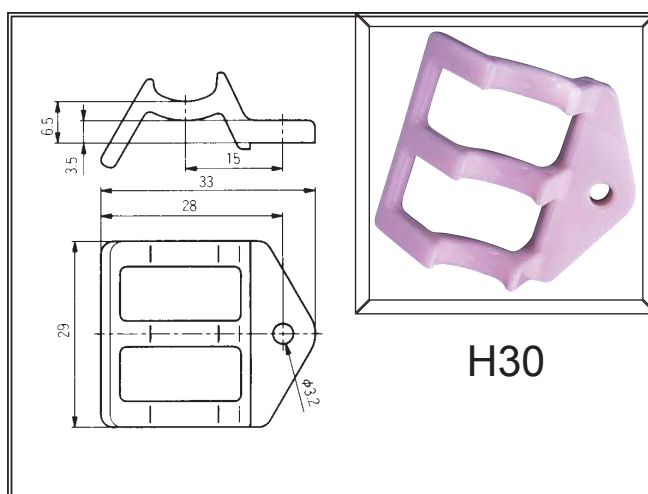
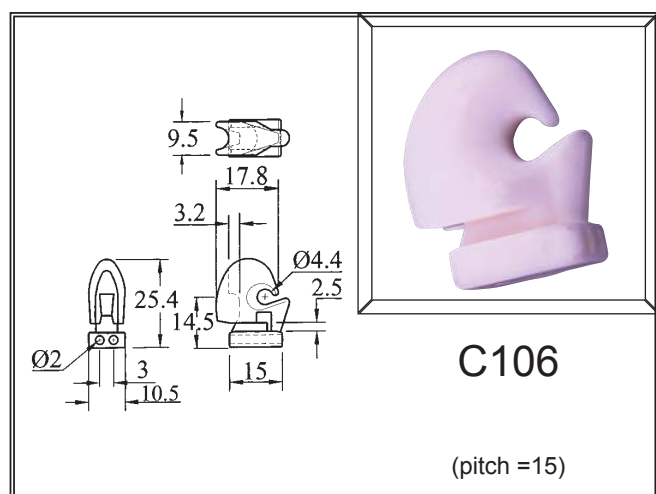
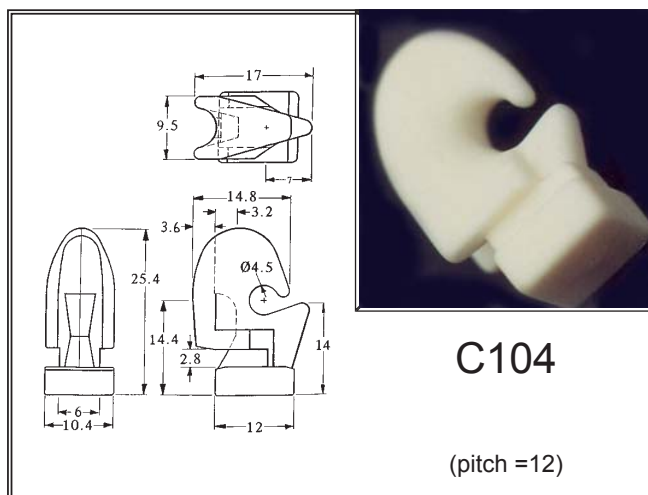
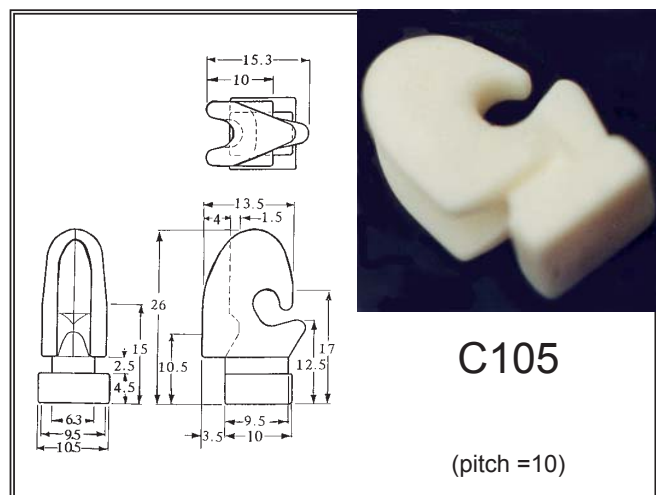


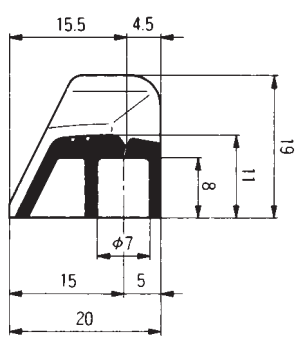




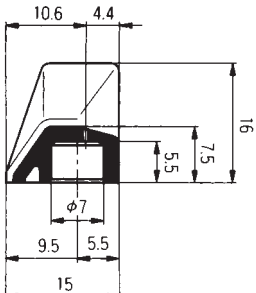






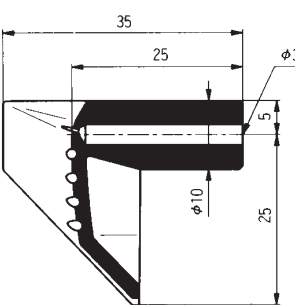


|      | Yarn Slot Width |
|------|-----------------|
| AP30 | 1.0             |
| AP31 | 1.3             |
| AP32 | 2.0             |



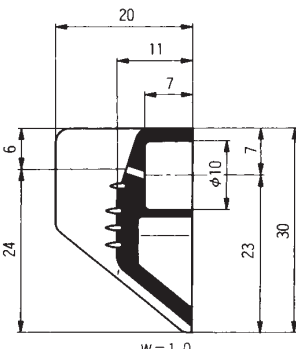
AP37

Yarn Slot Width = 1.2



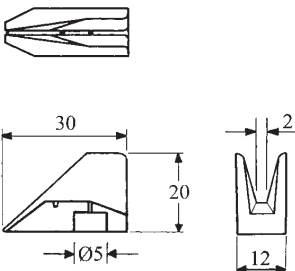
AP36

Yarn Slot Width = 1.5

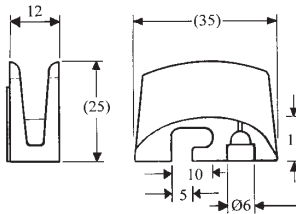


AP35

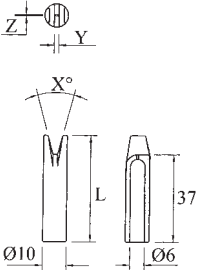
Yarn Slot Width = 1.0



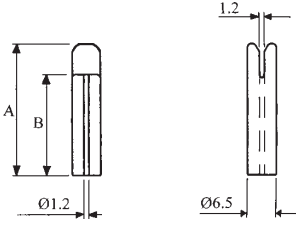
AP29



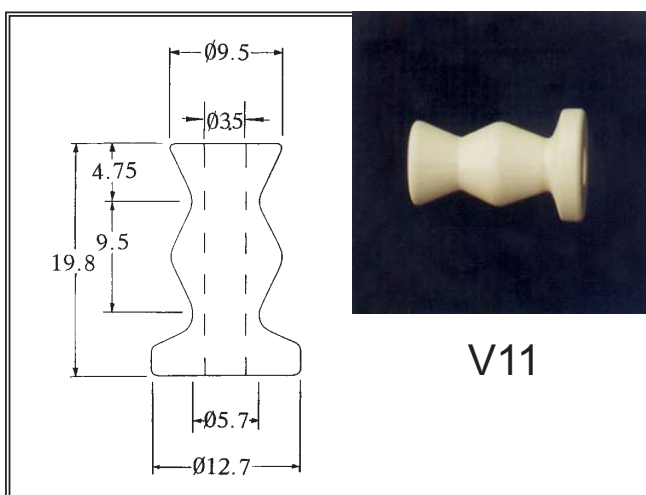
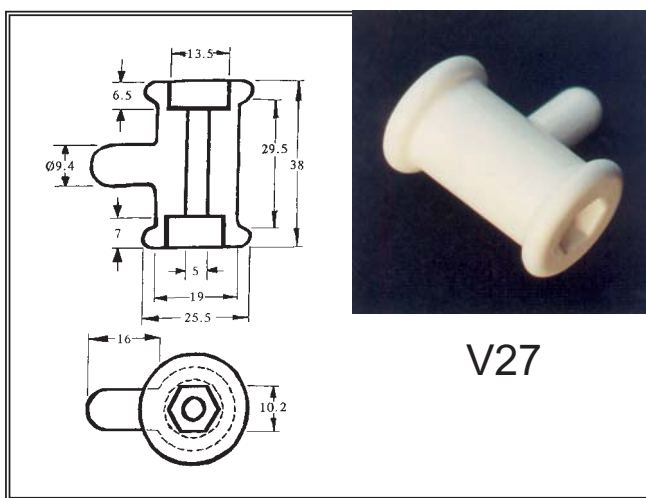
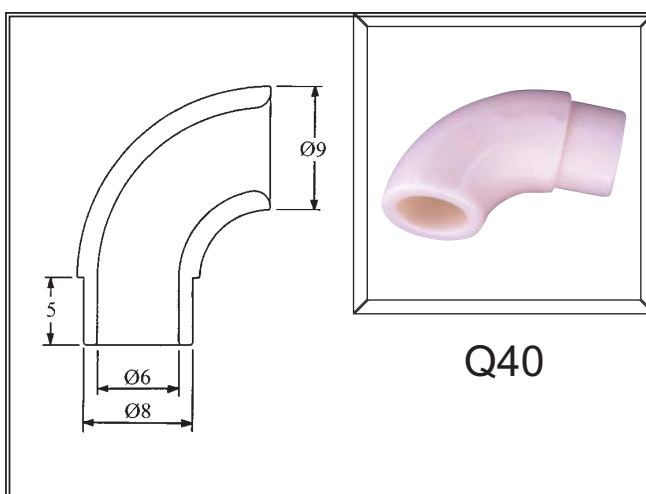
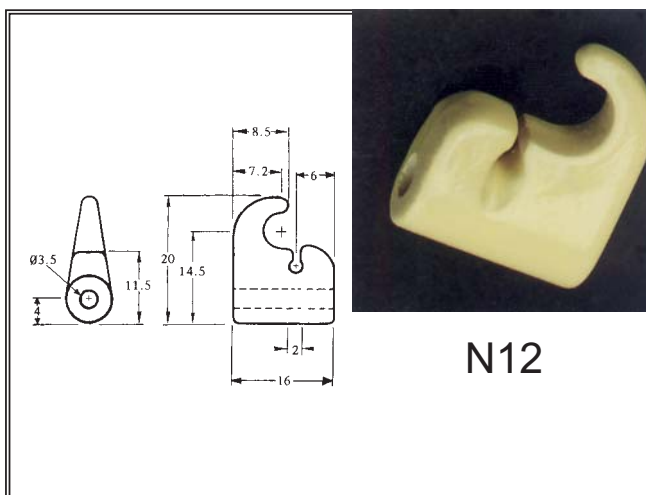
|      | Yarn Slot Width |
|------|-----------------|
| AP23 | 0.5             |
| AP21 | 4.0             |

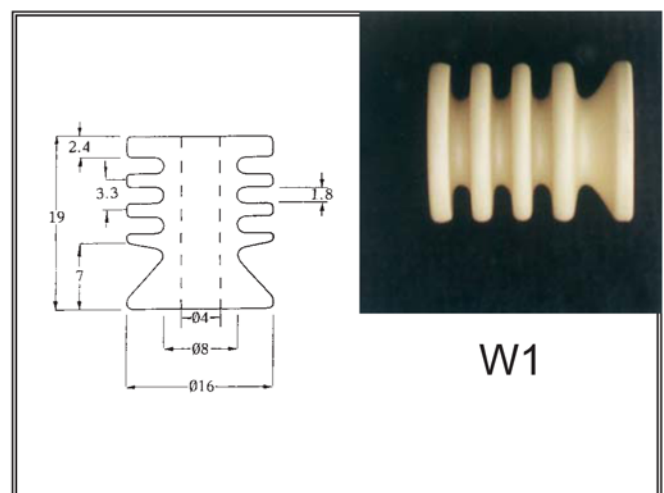
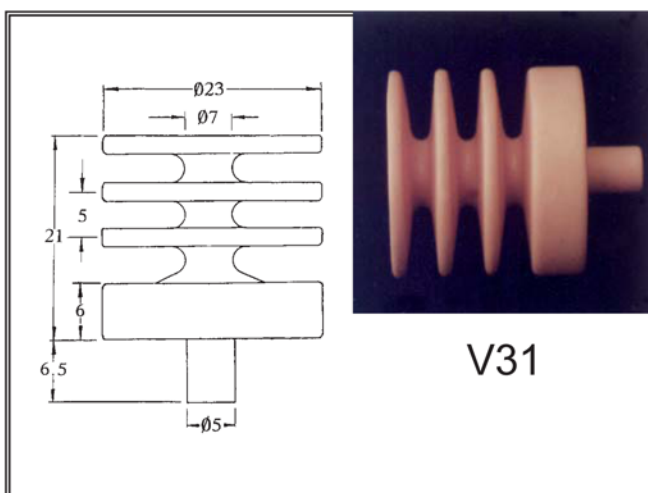
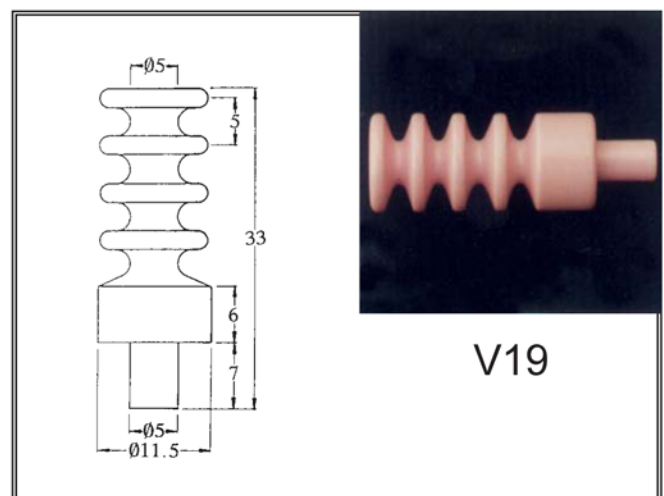
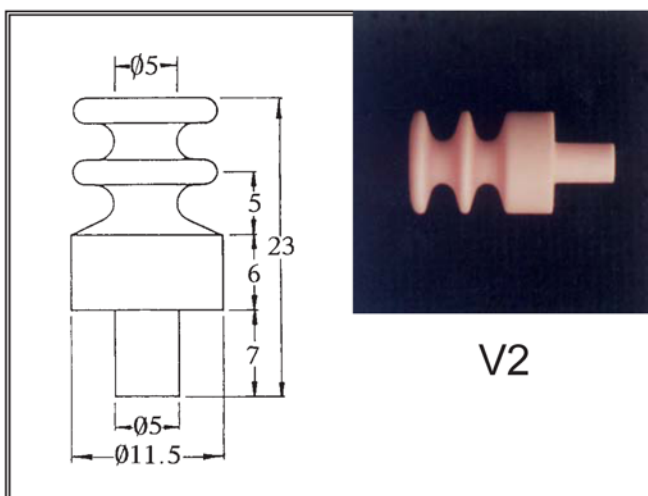
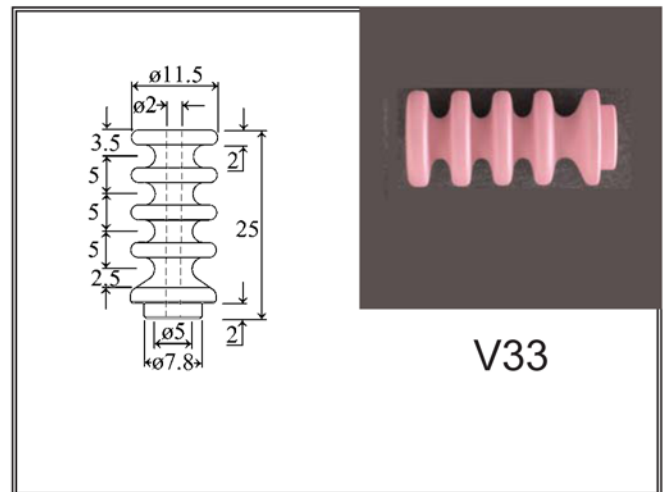
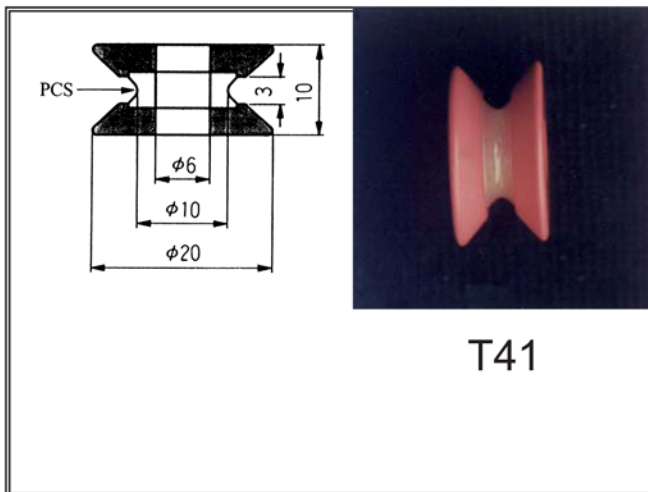
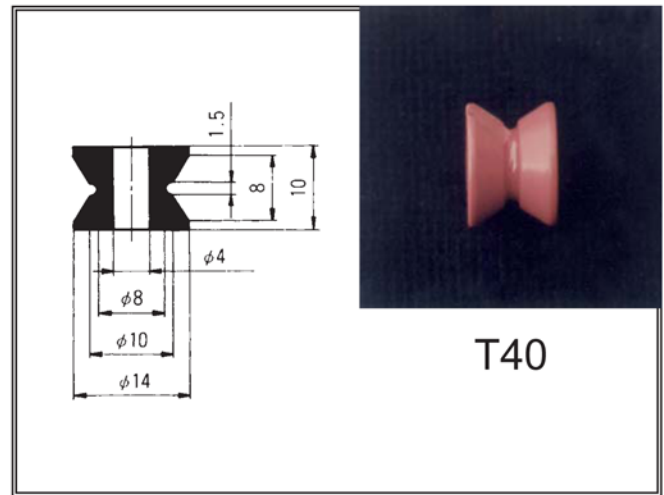
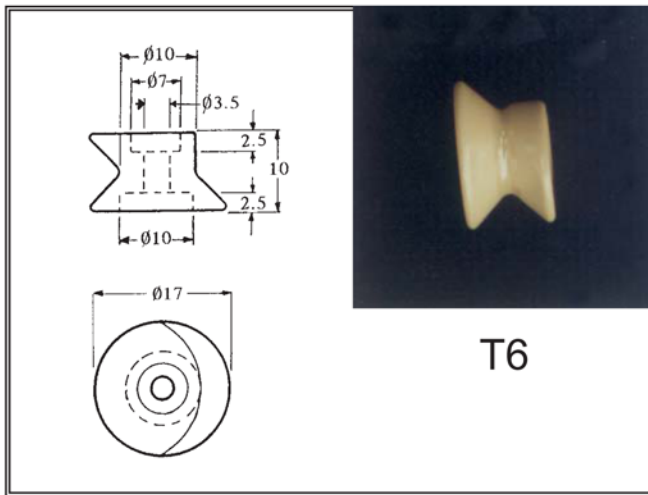


|      | L  | X° | Y | Z   |
|------|----|----|---|-----|
| AP41 | 45 | 30 | 2 | 0.5 |
| AP42 | 43 | 20 | 5 | 0.5 |
| AP43 | 43 | 20 | 6 | 0.3 |



|      | A  | B  |
|------|----|----|
| AP44 | 31 | 24 |
| AP45 | 34 | 25 |





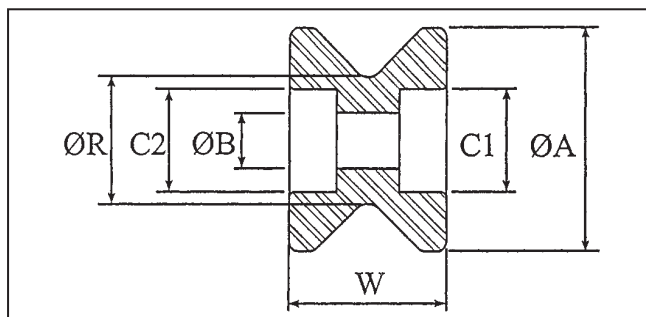


## Single Groove Rollers



CS = countersunk bore for screw

| Ref. | øA   | øB  | øR   | W    | øC1        | øC2        |
|------|------|-----|------|------|------------|------------|
| T34  | 14.0 | 3.2 | 10.0 | 8.0  |            |            |
| T2   | 14.0 | 4.3 | 10.0 | 10.0 |            |            |
| T42  | 14.0 | 3.5 | 8.0  | 10.0 | 6.5 x 3.0  |            |
| T3   | 16.0 | 4.0 | 10.0 | 9.0  |            |            |
| T4U  | 16.5 | 4.0 | 8.5  | 9.0  |            |            |
| T4V  | 16.5 | 4.0 | 8.5  | 9.0  |            |            |
| T28  | 17.0 | 4.0 | 10.0 | 9.0  |            |            |
| T37  | 17.0 | 5.0 | 8.0  | 7.0  |            |            |
| T25  | 17.0 | 6.0 | 8.0  | 11.0 |            |            |
| T47  | 17.0 | 3.3 | 10.0 | 9.5  |            |            |
| T32  | 18.0 | 5.0 | 10.0 | 8.0  |            |            |
| T23  | 18.2 | 3.3 | 9.5  | 9.0  | 8.0 x 0.5  |            |
| T9   | 19.0 | 3.2 | 10.2 | 12.8 |            |            |
| T33  | 20.0 | 4.3 | 9.5  | 11.0 | 10.0 x 2.0 |            |
| T45  | 20.0 | 4.3 | 10.0 | 14.1 | 14.4 x 2.0 | 14.4 x 2.0 |
| T44  | 20.0 | 6.0 | 8.0  | 10.0 |            |            |
| T13A | 20.5 | 5.0 | 10.0 | 13.5 | CS         |            |
| T13  | 20.5 | 3.0 | 10.0 | 13.6 | 7.8 x 3.0  |            |
| T36  | 23.5 | 9.6 | 15.0 | 8.0  |            |            |
| T35  | 24.9 | 6.0 | 14.1 | 13.1 | 9.0 x 1.5  |            |
| T15  | 25.0 | 6.0 | 10.0 | 18.0 | 9.0 x 1.5  |            |
| T38  | 25.6 | 4.0 | 20.0 | 7.8  | 15.2 x 1.3 | 15.2 x 1.3 |



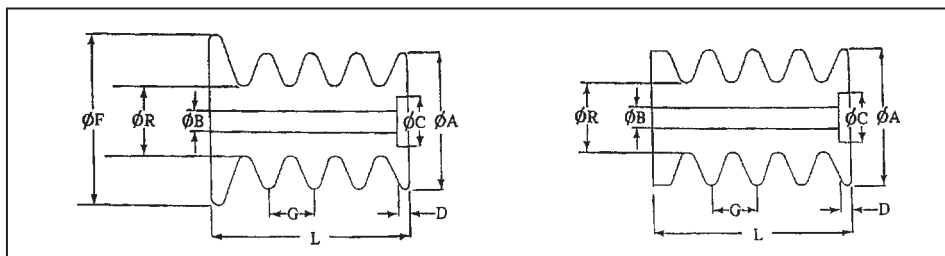
| Ref. | øA   | øB<br>(to clear) | øR   | W    | øC1       | øC2       |
|------|------|------------------|------|------|-----------|-----------|
| T26* | 29.3 | 6.0              | 16.5 | 14.0 | 9.0 x 1.5 | 9.0 x 0.8 |
| T27* | 29.3 | 6.0              | 10.0 | 14.0 | 9.0 x 1.5 | 9.0 x 0.8 |
| T39  | 29.8 | 6.0              | 17.2 | 9.0  | 9.0 x 2.0 | 9.0 x 0.8 |
| T21  | 38.7 | 4.0              | 26.0 | 9.0  |           |           |
| T21A | 38.7 | 6.3              | 26.0 | 9.0  |           |           |
| T29  | 39.0 | 10.0             | 21.0 | 16.0 |           |           |
| T30  | 39.0 | 15.0             | 21.0 | 16.0 |           |           |

\*asymmetric groove

Drawings available upon request



## Multi Groove Rollers



| Ref | $\phi A$ | $\phi B$ | $\phi R$ | $\phi F$ | L     | G     | No of grooves | $\phi C$ | D    |
|-----|----------|----------|----------|----------|-------|-------|---------------|----------|------|
| W28 | 13.50    | 5.00     | 9.00     |          | 34.00 | 7.00  | 5             |          |      |
| V32 | 13.70    | 3.30     | 10.00    |          | 15.60 | 4.80  | 2             |          |      |
| W25 | 14.00    | 3.50     | 9.00     |          | 20.00 | 4.00  | 3             | 9.00     | 4.00 |
| W26 | 14.00    | 3.30     | 6.00     |          | 21.00 | 4.50  | 3             |          |      |
| W27 | 15.00    | 4.30     | 9.00     |          | 20.00 | 3.60  | 4             |          |      |
| W35 | 15.00    | 5.00     | 8.00     |          | 26.50 | 3.00  | 8             |          |      |
| W6  | 15.75    | 3.18     | 7.60     |          | 30.30 | 3.50  | 6             |          |      |
| W37 | 15.90    | 6.30     | 9.00     | 20.00    | 22.00 | 4.60  | 4             |          |      |
| V13 | 16.00    | 3.50     | 8.00     |          | 19.00 | 3.50  | 3             |          |      |
| W31 | 16.00    | 5.30     | 10.00    | 21.00    | 34.00 | 6.00  | 5             |          |      |
| W3  | 16.00    | 6.20     | 9.50     |          | 27.00 | 4.80  | 4             |          |      |
| W9  | 16.00    | 3.50     | 9.50     |          | 36.50 | 6.30  | 5             |          |      |
| V29 | 16.50    | 4.50     | 10.50    |          | 12.50 | 4.70  | 2             |          |      |
| V28 | 16.50    | 4.50     | 10.50    |          | 15.80 | 4.20  | 3             |          |      |
| W29 | 16.50    | 4.50     | 10.50    |          | 18.00 | 4.00  | 4             |          |      |
| V30 | 16.50    | 4.50     | 10.50    |          | 24.00 | 6.00  | 4             |          |      |
| V9  | 17.00    | 5.00     | 8.00     |          | 20.00 | 10.00 | 2             |          |      |
| V10 | 17.00    | 6.00     | 8.00     |          | 23.00 | 12.00 | 2             |          |      |
| W21 | 17.60    | 3.50     | 10.00    | 23.80    | 9.00  | —     | 1             | 6.00     | 4.00 |
| W22 | 17.60    | 3.50     | 10.00    | 23.80    | 14.00 | 6.00  | 2             | 6.00     | 4.00 |
| W23 | 17.60    | 3.50     | 10.00    | 23.80    | 20.00 | 6.00  | 3             | 6.00     | 4.00 |
| W24 | 17.60    | 3.50     | 11.00    | 23.80    | 22.00 | 5.00  | 4             | 6.00     | 4.00 |
| W30 | 21.00    | 5.30     | 8.20     |          | 20.00 | 9.00  | 2             |          |      |
| W36 | 21.00    | 5.30     | 9.00     |          | 21.00 | 5.00  | 3             |          |      |
| W32 | 29.00    | 6.20     | 16.00    |          | 26.00 | 12.50 | 2             | 10.00    | 3.00 |

\*Counter bore both ends

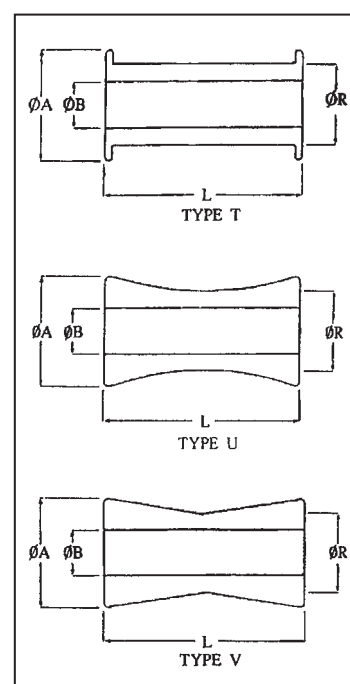
Drawings available upon request

## Bobbins and Diabolos

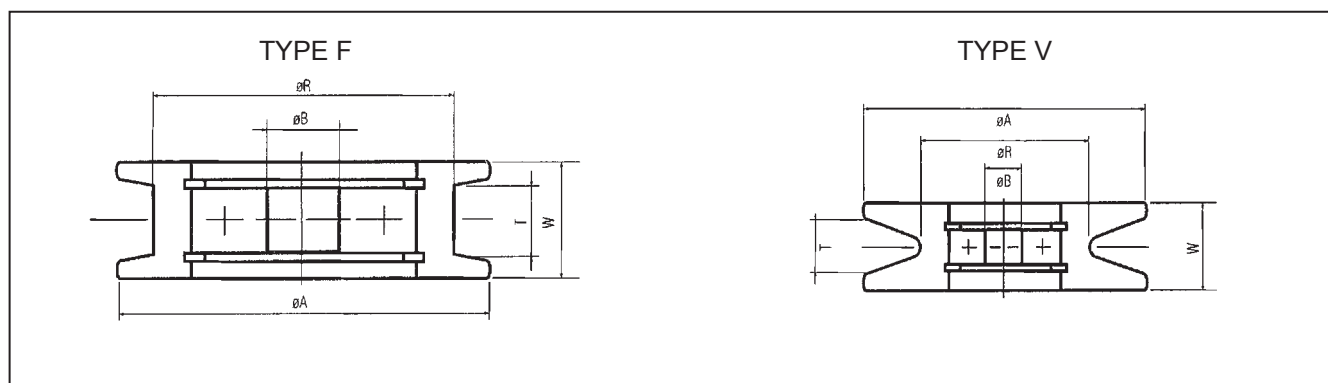


| Ref. | $\phi A$ | $\phi B$ | $\phi R$ | L     | Type |
|------|----------|----------|----------|-------|------|
| U11  | 4.50     | 2.20     | 3.50     | 25.00 | U    |
| U18  | 6.00     | 2.00     | 3.50     | 10.50 | U    |
| U16  | 6.50     | 3.10     | 5.40     | 19.00 | U    |
| U42  | 8.00     | 3.00     | 5.00     | 10.00 | U    |
| U36  | 8.20     | 4.00     | 6.20     | 10.50 | U    |
| U37  | 10.80    | 3.20     | 6.80     | 20.00 | T    |
| U32  | 12.00    | 6.00     | 11.50    | 12.00 | V    |
| U33  | 12.00    | 6.00     | 10.40    | 20.00 | U    |

| Ref.  | $\phi A$ | $\phi B$ | $\phi R$ | L     | Type |
|-------|----------|----------|----------|-------|------|
| U34   | 15.00    | 7.50     | 10.40    | 20.00 | U    |
| U27   | 15.00    | 4.00     | 8.00     | 15.00 | V    |
| U29   | 15.20    | 4.00     | 9.00     | 21.00 | T    |
| U35*  | 20.00    | 6.30     | 10.00    | 20.00 | V    |
| U25   | 20.00    | 6.30     | 10.00    | 25.00 | V    |
| U25C* | 20.00    | 6.30     | 10.00    | 25.00 | V    |
| U28   | 20.00    | 6.30     | 10.00    | 25.00 | U    |
| U26#  | 38.00    | 4.50     | 19.00    | 32.00 | T    |



# CERAMIC BEARING ROLLERS

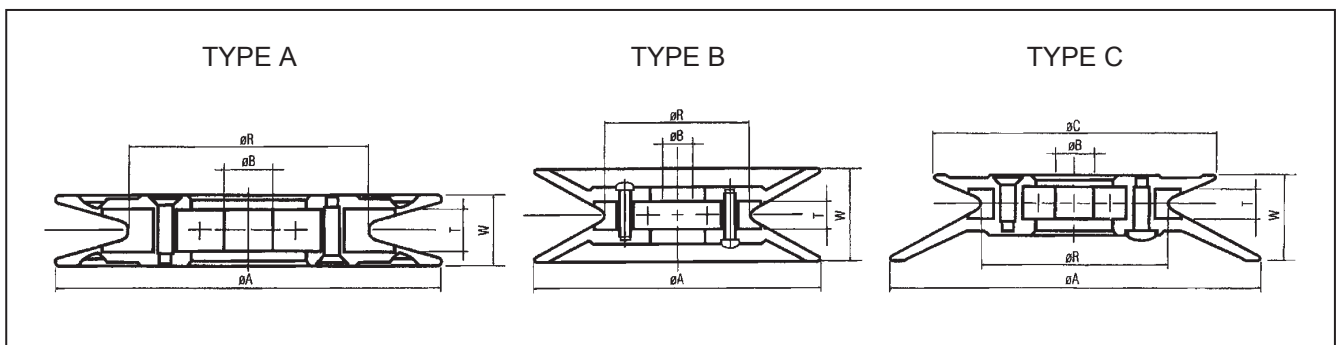


| Part No | øA   | øB                   | øR   | W   | T   |
|---------|------|----------------------|------|-----|-----|
| CBR1V   | 8    | 1.5 or <u>2</u>      | 6    | 3   | 2.3 |
| CBR2V   | 10   | <u>2</u>             | 8    | 4   | 3   |
| CBR3V   | 10.5 | <u>2</u>             | 7    | 3.5 | 2.3 |
| CBR4V   | 14   | <u>3</u>             | 10   | 6   | 4   |
| CBR5V   | 16.5 | ②, or <u>4</u>       | 13.5 | 7   | 4   |
| CBR6V   | 17   | <u>3</u>             | 13   | 12  | 7   |
| CBR7V   | 20   | ②, <u>4</u> , 5 or 7 | 14   | 10  | 7   |
| CBR8V   | 23   | <u>3</u>             | 15   | 8   | 5.5 |
| CBR9V   | 27   | 4, <u>5</u> or 6     | 15   | 11  | 8   |
| CBR10V  | 27   | 4, <u>5</u> or 6     | 18.5 | 9.5 | 5.5 |
| CBR11F  | 30   | 4, <u>5</u> or 8     | 22   | 10  | 5   |
| CBR12F  | 30   | <u>5</u>             | 20   | 24  | 10  |
| CBR13V  | 30   | <u>5</u>             | 15   | 11  | 9   |
| CBR14V  | 40   | 4, <u>5</u> or 8     | 24   | 12  | 8   |
| CBR15V  | 40   | <u>8</u> or 10       | 27   | 24  | 18  |
| CBR16F  | 50   | <u>10</u>            | 40   | 16  | 10  |
| CBR17F  | 50   | <u>10</u>            | 40   | 24  | 18  |

②, = Special low torque bearing

Bearings (øB) underlined indicate standard sizes

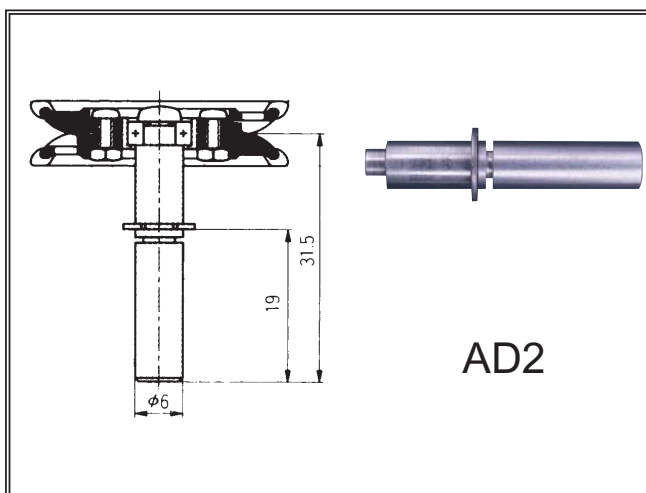
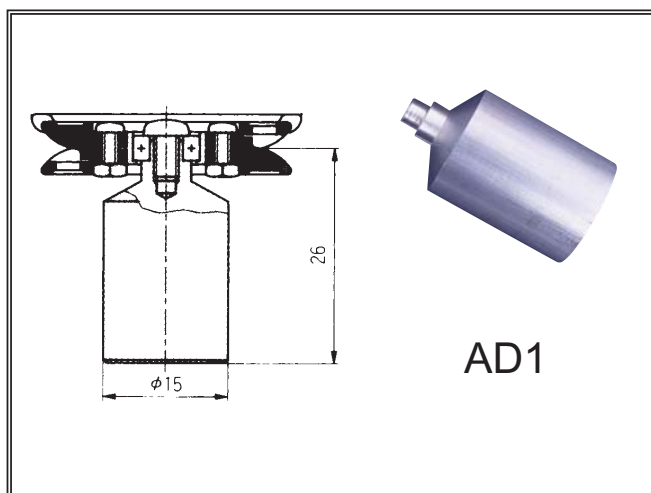
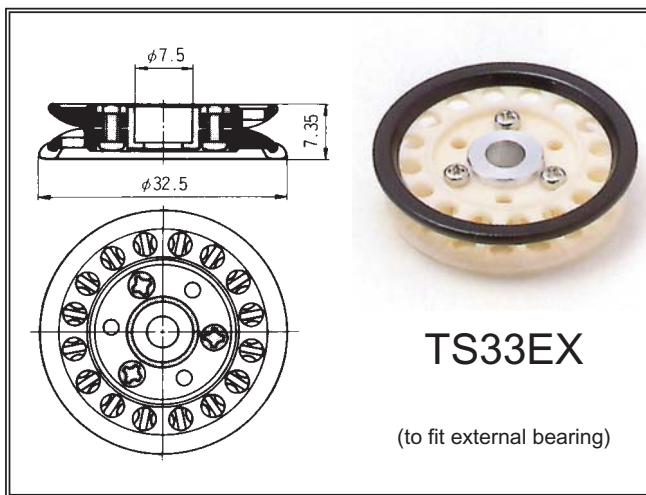
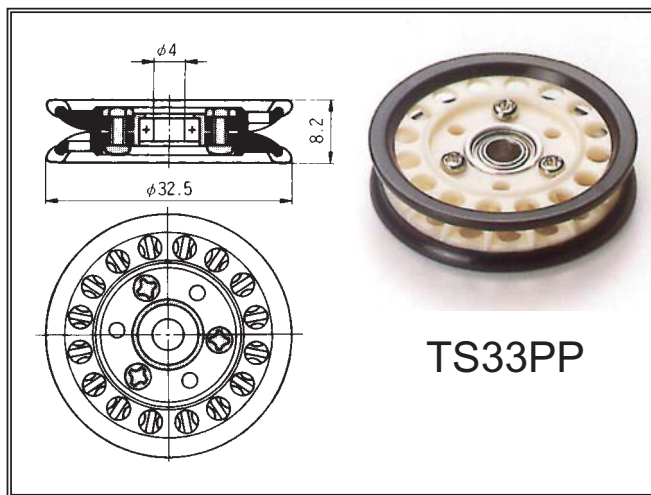
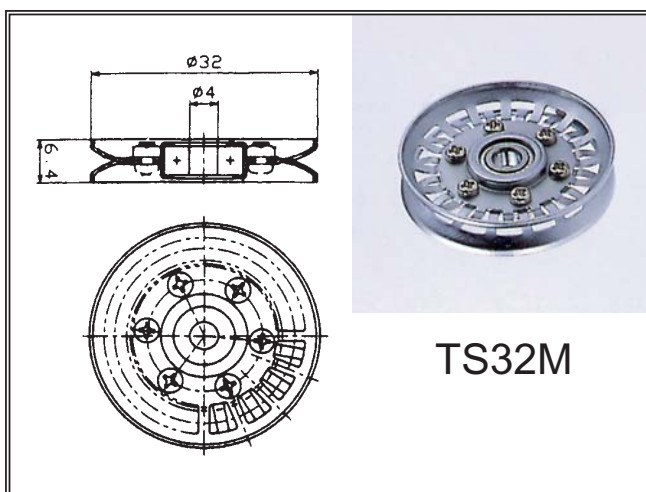
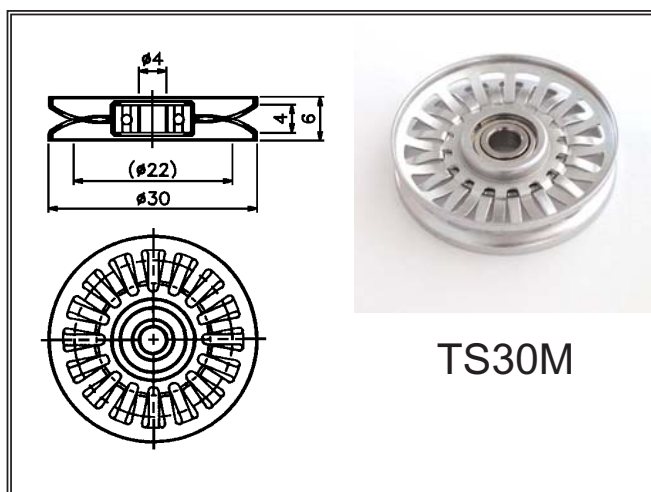
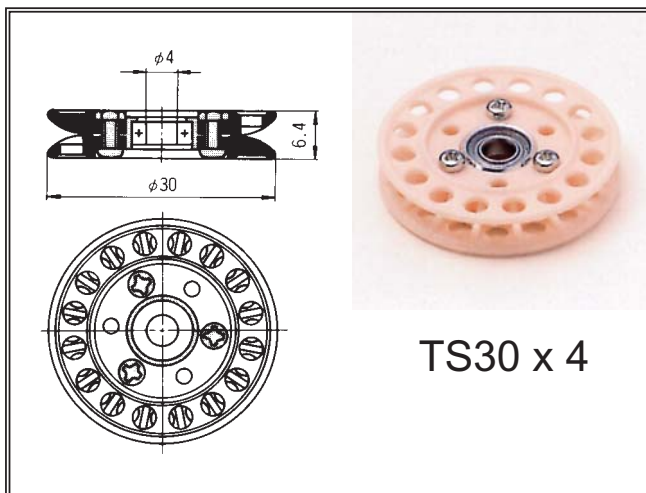
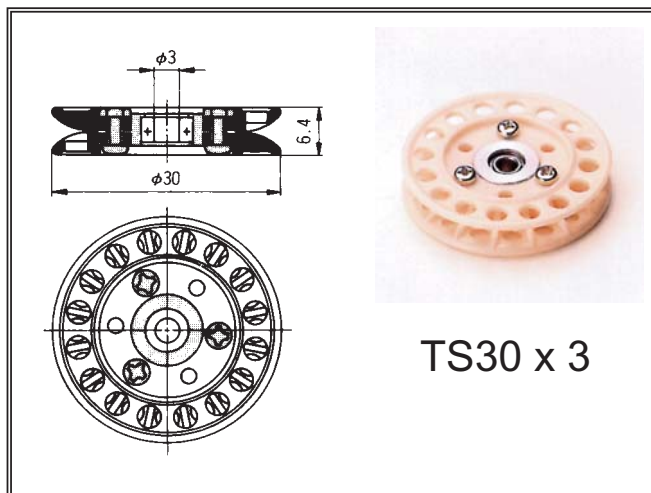
# CERAMIC BEARING ROLLERS

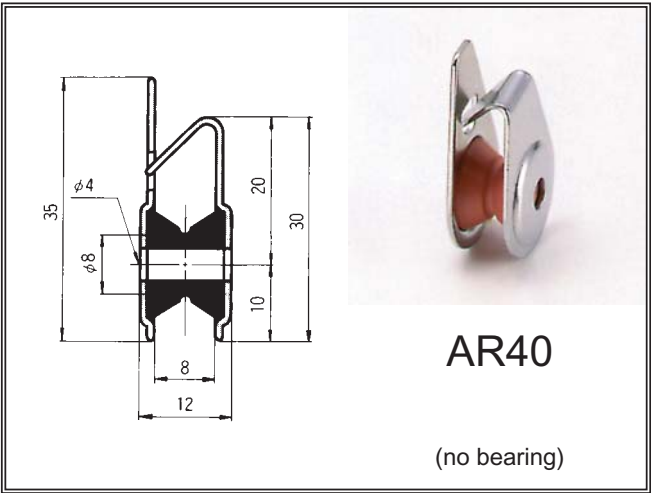
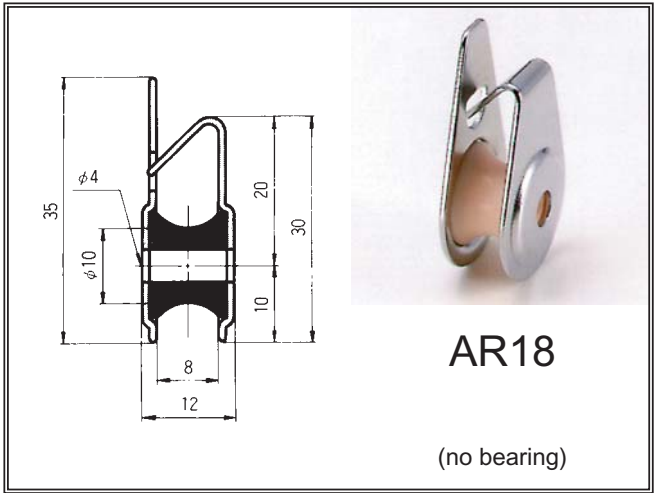
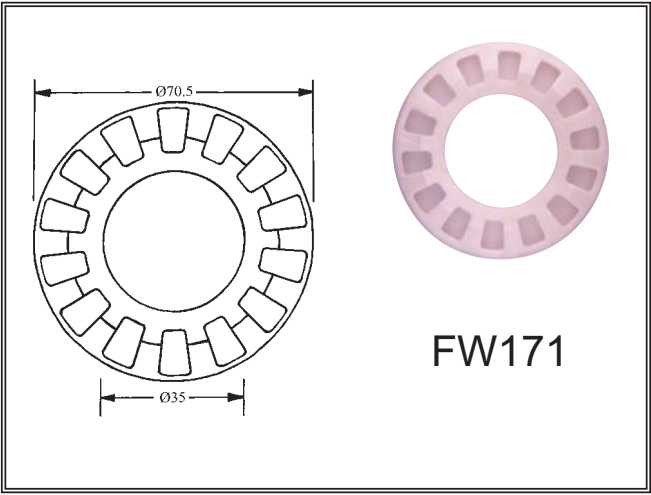
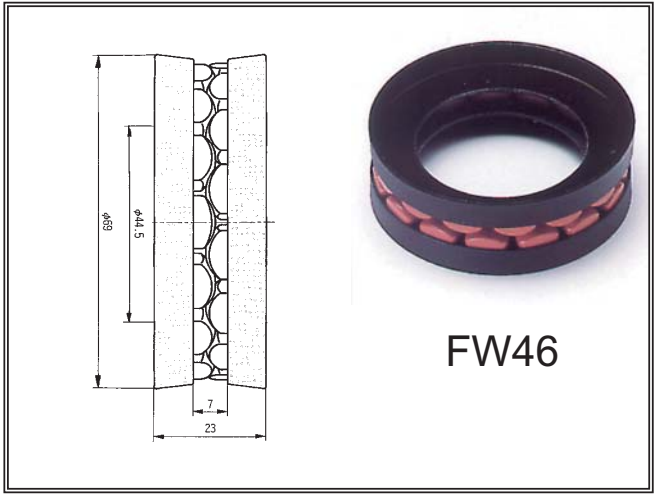
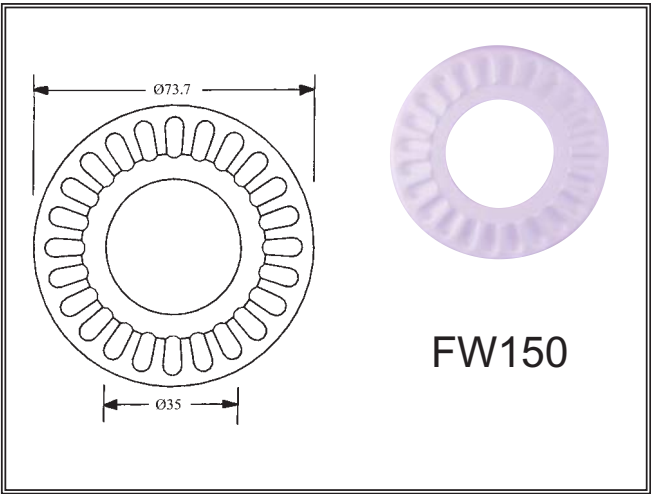
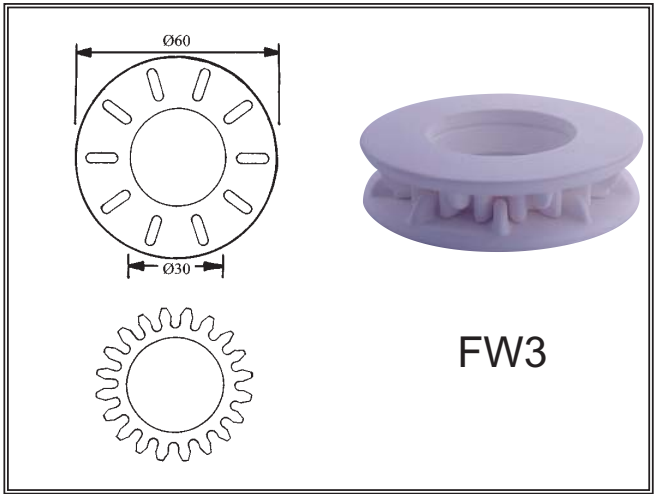
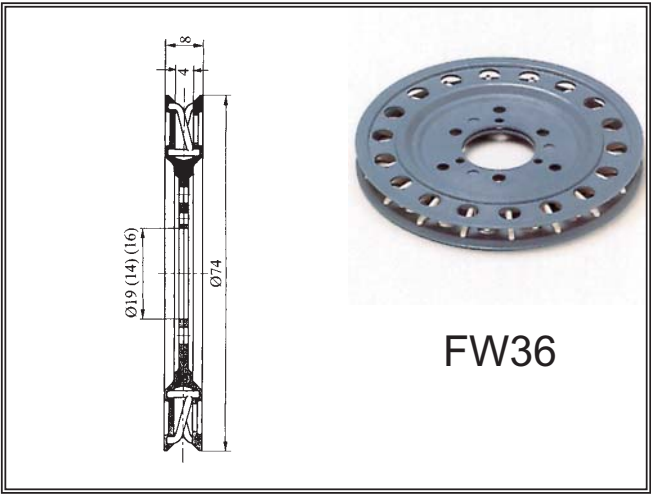
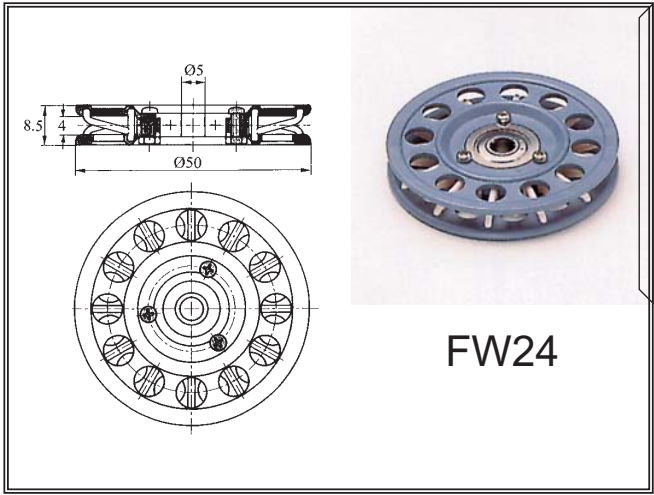


| Part No | øA   | øB                              | øC   | øR | W    | T |
|---------|------|---------------------------------|------|----|------|---|
| PCBR1A  | 20   | <u>3</u>                        |      | 15 | 4    | 3 |
| PCBR2A  | 28.5 | ②, <u>4</u> or 5                |      | 20 | 6    | 4 |
| PCBR3B  | 30   | <u>3</u>                        |      | 15 | 10   | 3 |
| PCBR4C  | 30   | <u>3</u>                        | 20   | 15 | 7    | 3 |
| PCBR5B  | 40   | ②, <u>4</u> or 5                |      | 20 | 15   | 4 |
| PCBR6C  | 40   | ②, <u>4</u> or 5                | 28.5 | 20 | 10.5 | 4 |
| PCBR7A  | 45   | ④, <u>5</u> , <u>6</u> , 7 or 8 |      | 30 | 10   | 6 |
| PCBR8A  | 60   | 7 or <u>8</u>                   |      | 40 | 12   | 6 |
| PCBR9B  | 60   | ④, <u>5</u> , <u>6</u> , 7 or 8 |      | 30 | 20   | 6 |
| PCBR10C | 60   | ④, <u>5</u> , <u>6</u> , 7 or 8 | 45   | 30 | 15   | 6 |
| PCBR11A | 80   | <u>10</u>                       |      | 50 | 15   | 9 |
| PCBR12B | 80   | <u>8</u>                        |      | 40 | 25   | 6 |
| PCBR13C | 80   | <u>8</u>                        | 60   | 40 | 18.5 | 6 |
| PCBR14B | 100  | <u>10</u>                       |      | 50 | 30   | 9 |
| PCBR15C | 100  | <u>10</u>                       | 80   | 50 | 22.5 | 9 |

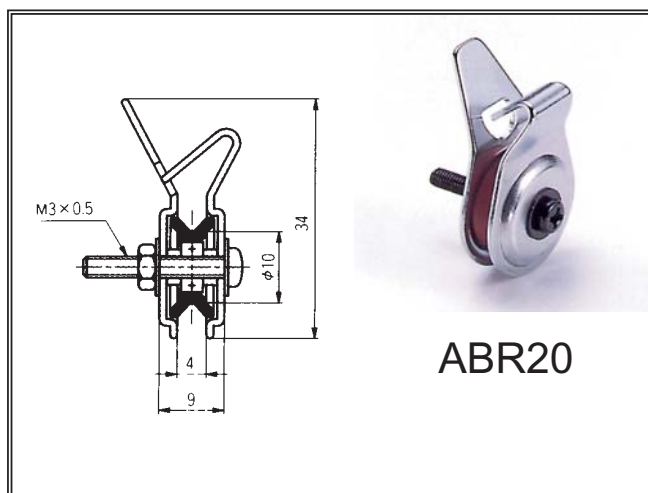
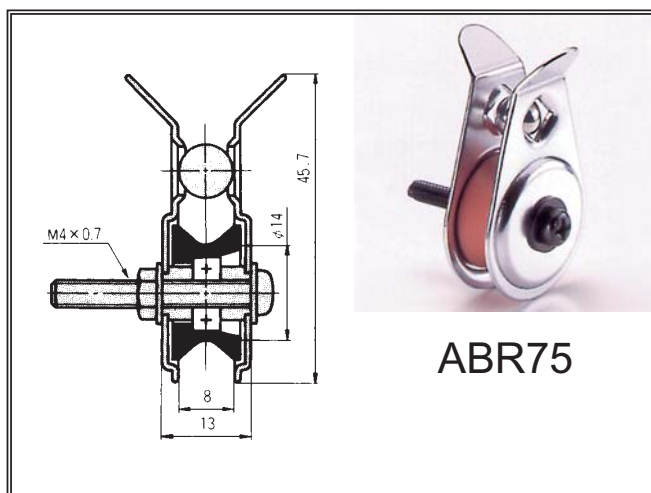
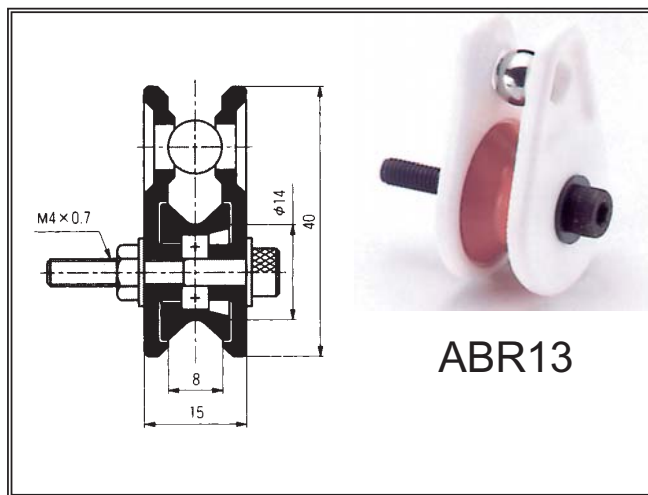
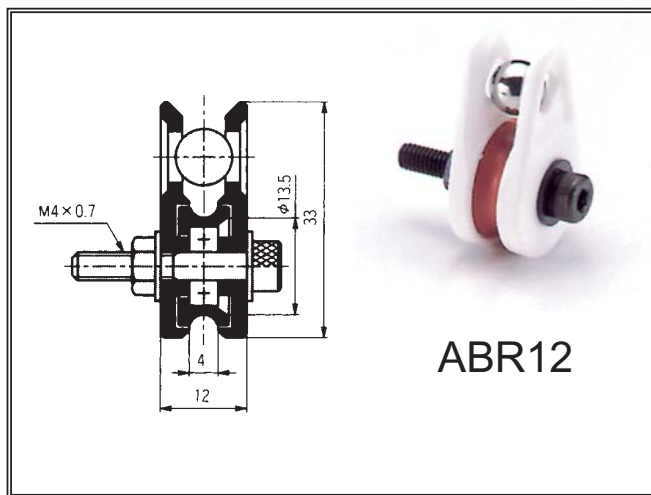
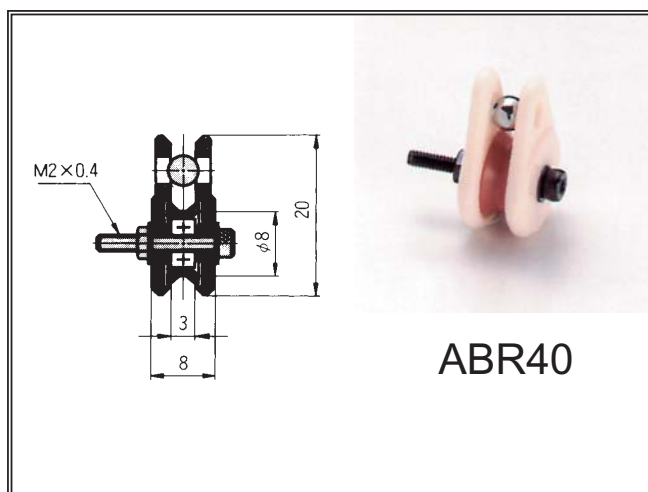
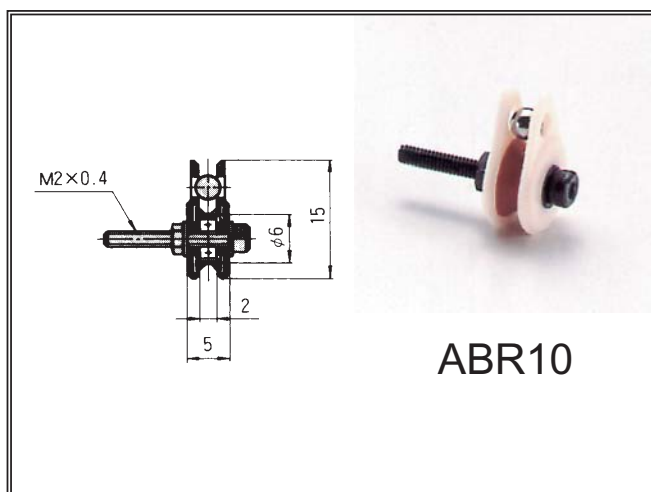
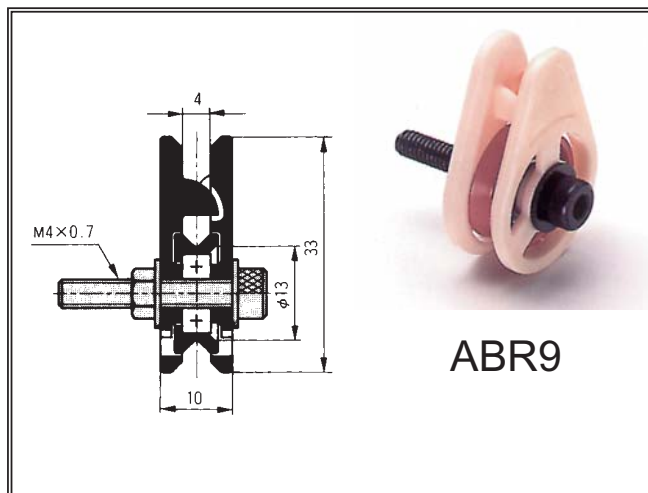
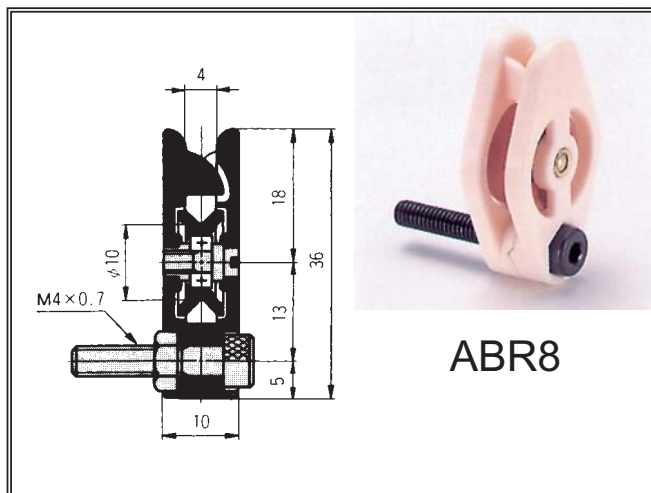
②, ④ = Special low torque bearing

Bearings (øB) underlined indicate standard sizes

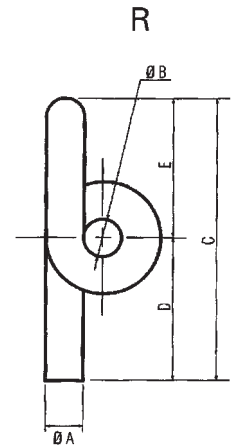
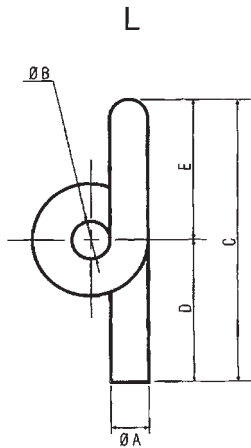






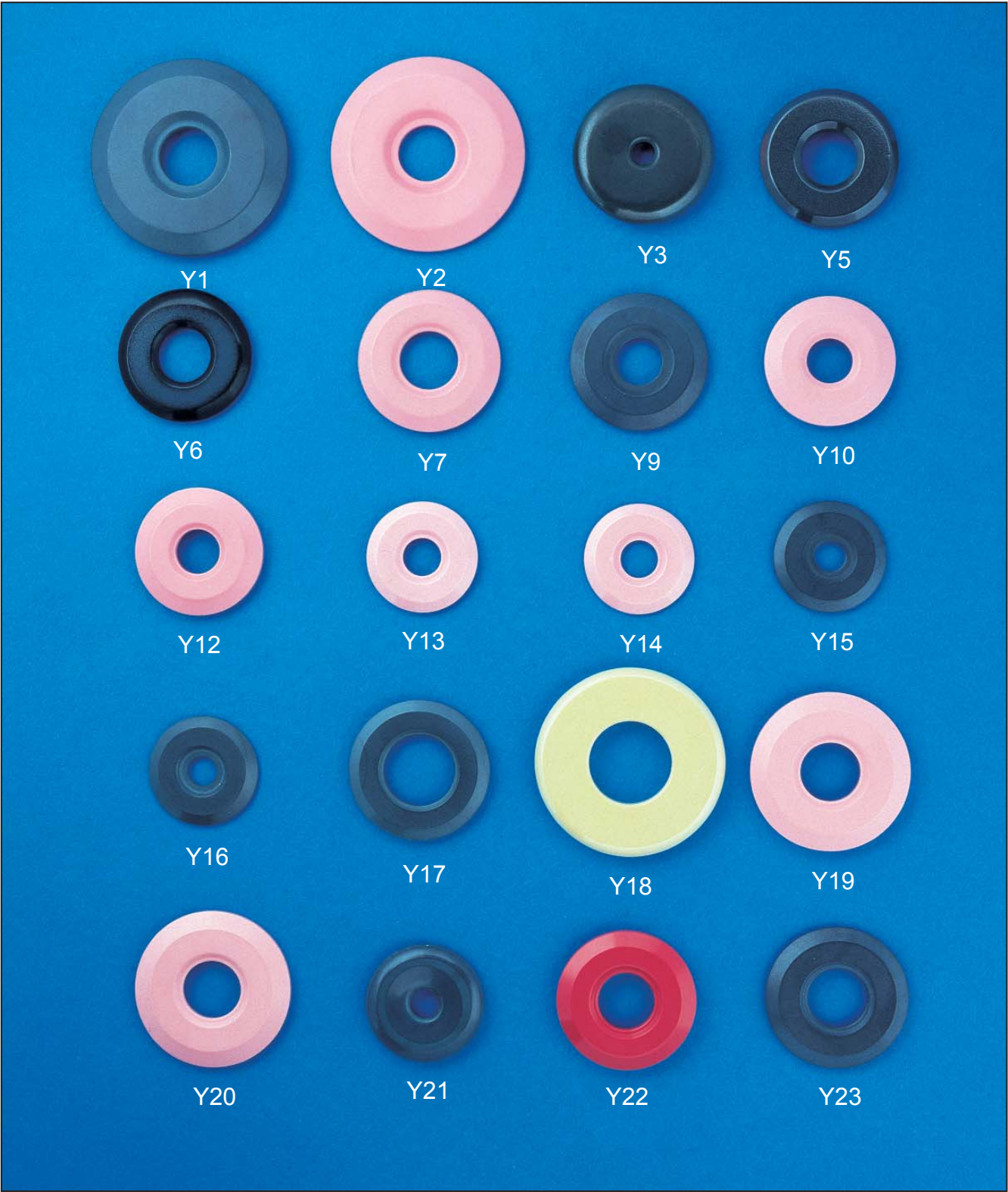


# PIGTAILS

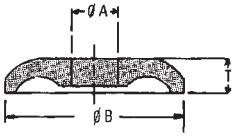


| Ref. | R or L HAND | øA  | øB   | C    | D    | E    | REMARKS                |
|------|-------------|-----|------|------|------|------|------------------------|
| C50  | R & L       | 3.0 | 1.0  | 21.5 | 15.0 | 6.5  |                        |
| C52  | R           | 3.0 | 2.0  | 22.0 | 17.0 | 5.0  |                        |
| C30  | R & L       | 3.0 | 3.0  | 25.0 | 14.0 | 11.0 |                        |
| C9   | R & L       | 3.0 | 2.0  | 27.0 | 20.0 | 7.0  |                        |
| C10  | R & L       | 3.0 | 3.0  | 27.0 | 20.0 | 7.0  | Eye in line with shank |
| C32  | R           | 3.2 | 5.5  | 36.0 | 25.0 | 11.0 |                        |
| C36  | R & L       | 3.2 | 4.0  | 32.0 | 21.0 | 11.0 | Eye in line with shank |
| C2   | R & L       | 4.0 | 1.0  | 20.0 | 10.0 | 10.0 | ▲Section eye           |
| C4   | R & L       | 4.0 | 1.0  | 30.0 | 15.0 | 15.0 | ▲Section eye           |
| C31  | R & L       | 4.0 | 4.0  | 25.0 | 15.0 | 10.0 |                        |
| C13  | R           | 4.0 | 3.0  | 28.0 | 20.0 | 8.0  |                        |
| C20  | R & L       | 4.0 | 4.0  | 35.0 | 20.0 | 15.0 |                        |
| C14  | R & L       | 4.0 | 3.0  | 28.0 | 20.0 | 8.0  | Fixing hole 1.5        |
| C15  | L           | 4.0 | 4.5  | 33.0 | 22.0 | 11.0 |                        |
| C22  | R           | 4.0 | 6.0  | 53.0 | 37.0 | 16.0 |                        |
| D8   | R & L       | 5.0 | 5.0  | 42.0 | 30.0 | 12.0 |                        |
| D16  | L           | 5.0 | 5.0  | 50.0 | 38.0 | —    | Double coil            |
| D11  | R & L       | 5.0 | 5.0  | 55.0 | 42.0 | 13.0 |                        |
| D12  | R           | 5.5 | 5.0  | 46.0 | 31.0 | 15.0 |                        |
| C17  | R & L       | 6.0 | 1.5  | 25.0 | 10.0 | 15.0 | Fixing hole 3.2        |
| D17  | L           | 6.0 | 3.0  | 25.0 | 15.0 | 10.0 | Fixing hole 2.0        |
| D15  | R & L       | 6.0 | 1.5  | 31.0 | 25.0 | 6.0  |                        |
| D18  | R & L       | 6.0 | 10.0 | 60.0 | 45.0 | 15.0 |                        |

STANDARD TENSION DISCS

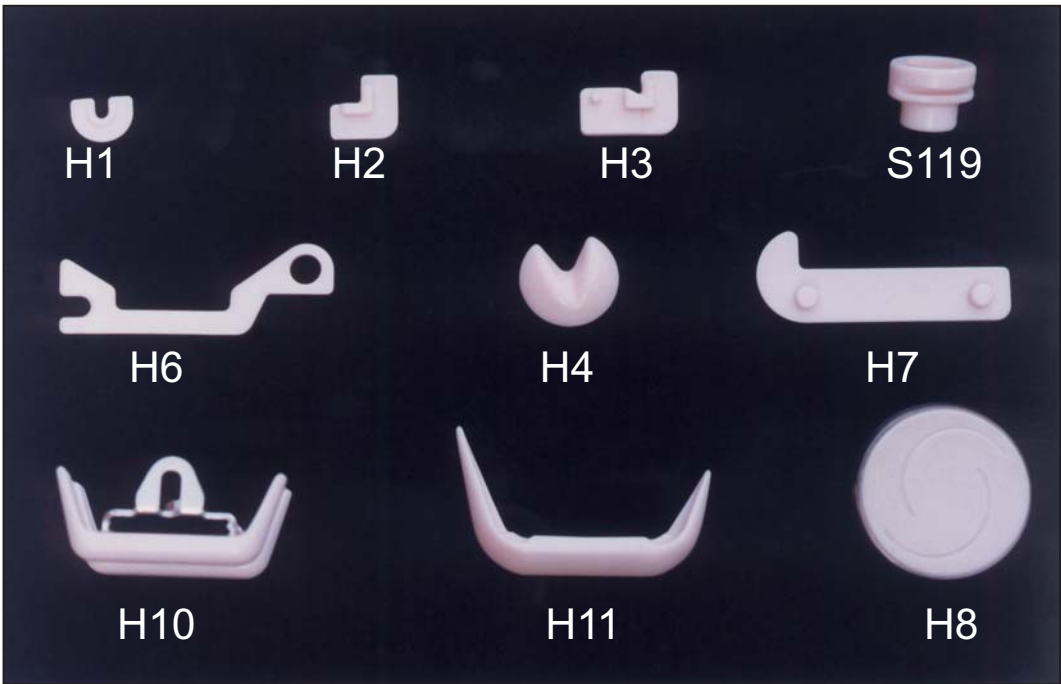


| Ref. | A<br>(to clear) | B    | T   | Approx.<br>Weight (g) |
|------|-----------------|------|-----|-----------------------|
| Y1   | 10.0            | 37.0 | 4.8 | 11.5                  |
| Y2   | 10.0            | 36.4 | 3.5 | 7.5                   |
| Y3   | 4.0             | 25.4 | 4.0 | 7.0                   |
| Y5   | 10.0            | 25.6 | 4.8 | 6.5                   |
| Y6   | 10.0            | 25.0 | 3.0 | 2.1                   |
| Y7   | 10.0            | 24.7 | 3.0 | 3.0                   |
| Y9   | 8.5             | 26.0 | 2.8 | 3.5                   |
| Y10  | 8.0             | 24.2 | 3.0 | 3.2                   |
| Y12  | 8.1             | 24.0 | 3.1 | 3.3                   |
| Y13  | 6.5             | 20.5 | 2.8 | 2.0                   |

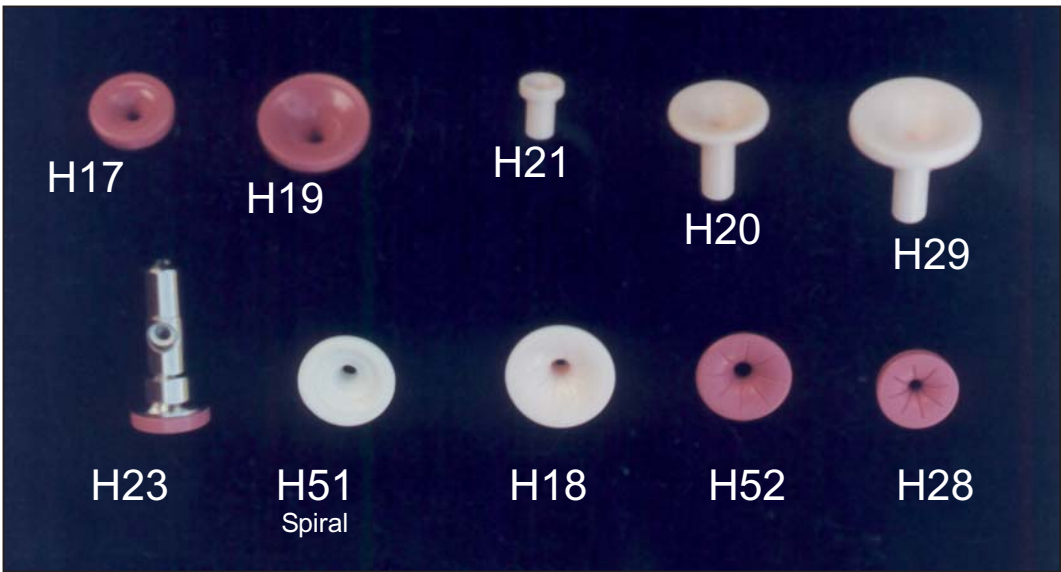


| Ref. | A<br>(to clear) | B    | T   | Approx.<br>Weight (g) |
|------|-----------------|------|-----|-----------------------|
| Y14  | 6.5             | 20.5 | 2.3 | 1.0                   |
| Y15  | 5.0             | 20.5 | 2.8 | 2.0                   |
| Y16  | 5.0             | 20.5 | 2.2 | 1.0                   |
| Y17  | 12.5            | 26.5 | 2.8 | 3.3                   |
| Y18  | 15.0            | 35.2 | 3.8 | 11.3                  |
| Y19  | 10.5            | 29.5 | 4.0 | 5.0                   |
| Y20  | 10.5            | 29.5 | 3.0 | 3.6                   |
| Y21  | 5.0             | 22.0 | 3.5 | 3.0                   |
| Y22  | 10.5            | 26.0 | 4.0 | 5.0                   |
| Y23  | 10.5            | 26.4 | 2.8 | 3.5                   |

Autoconer Guides



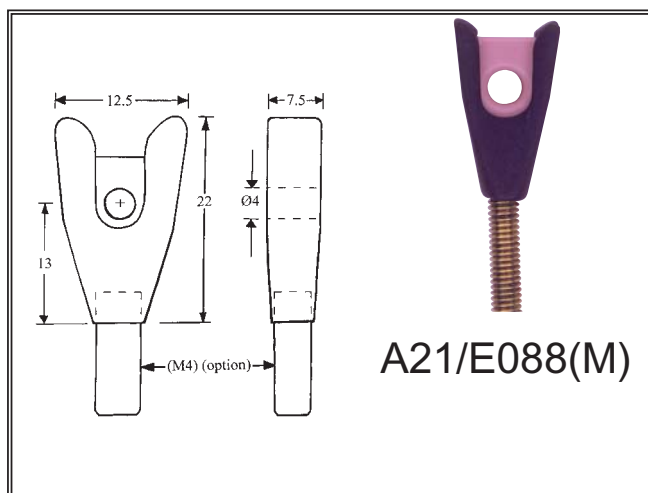
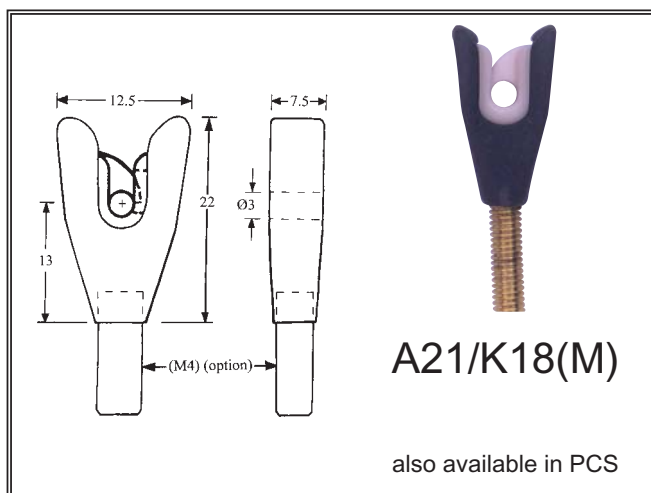
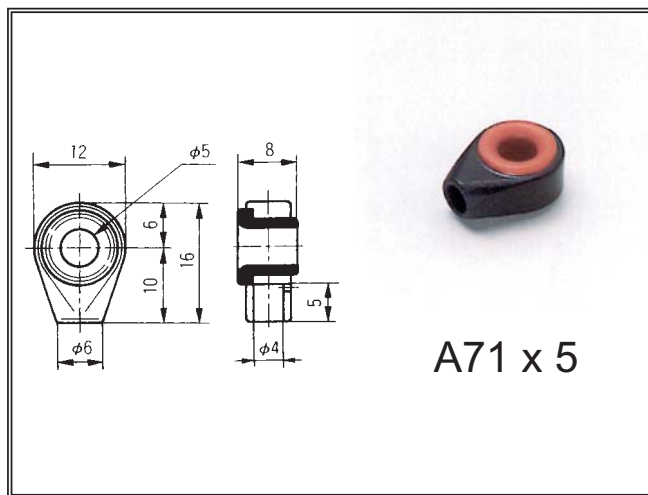
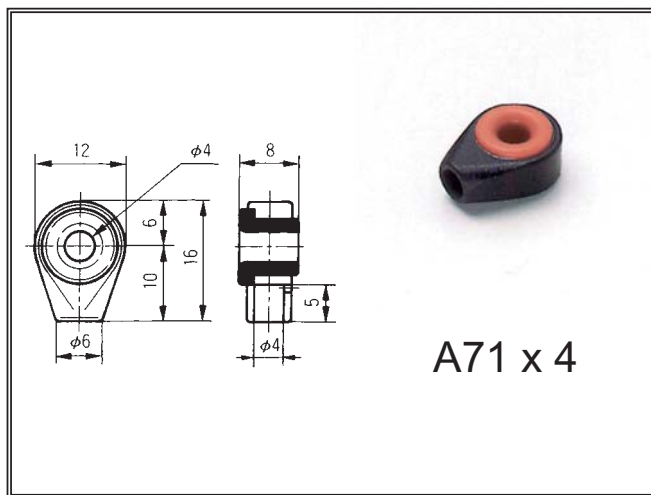
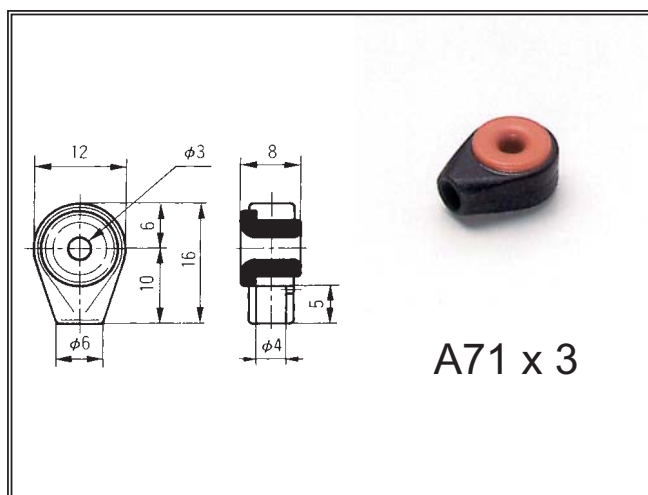
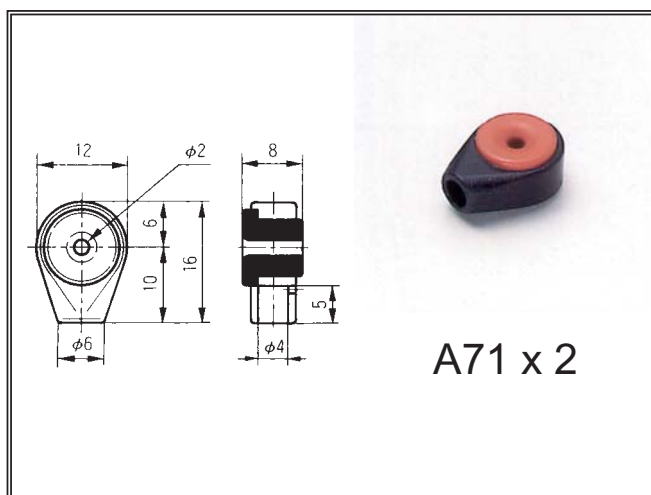
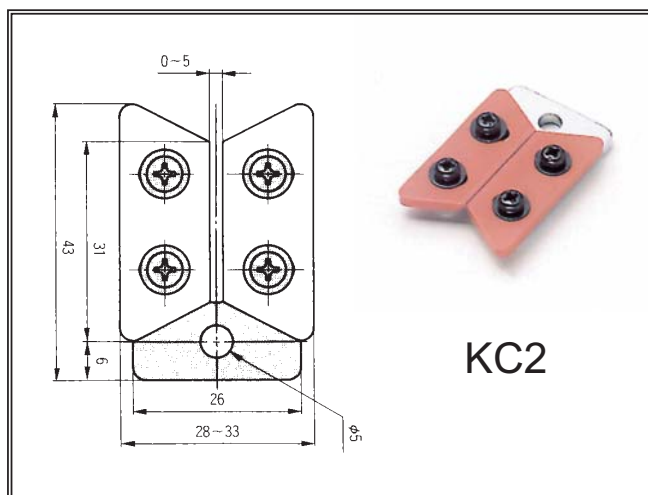
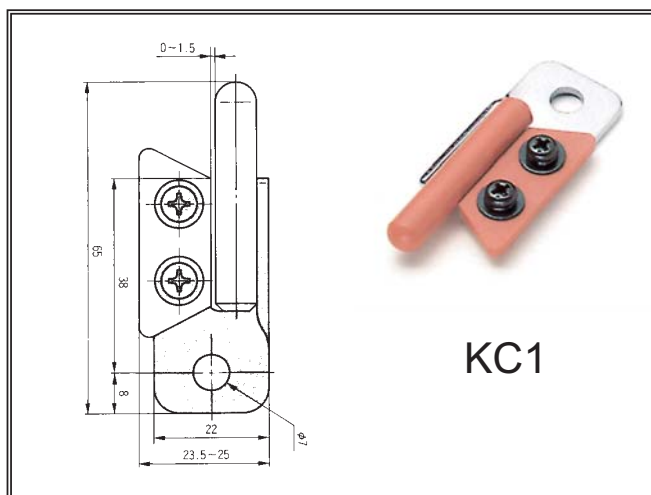
OE Guides



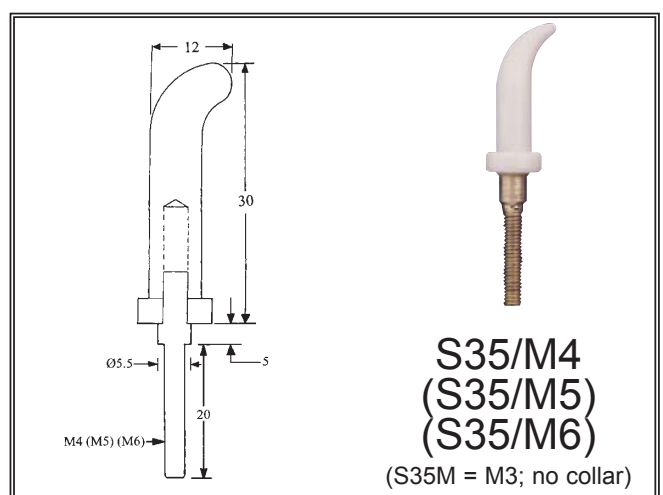
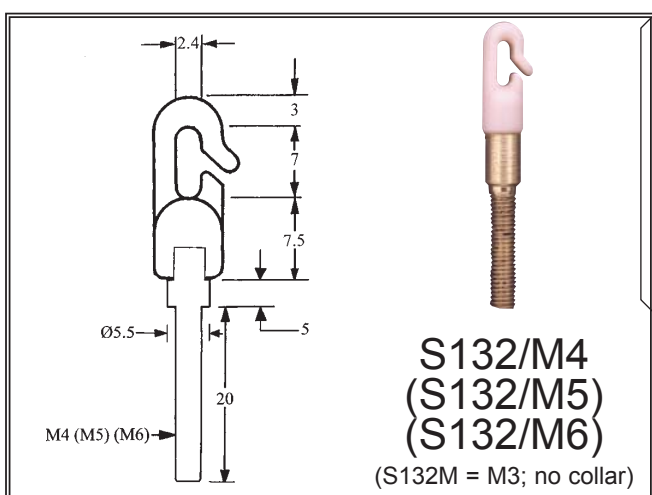
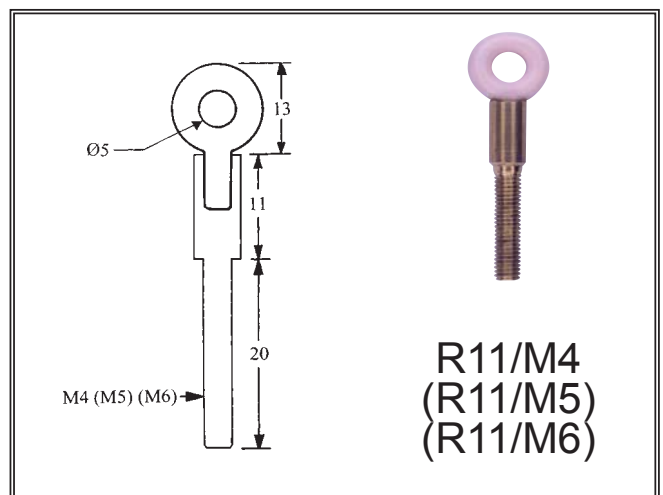
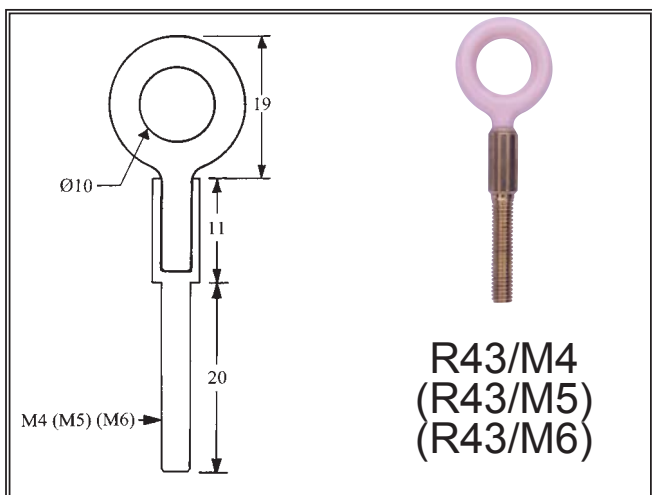
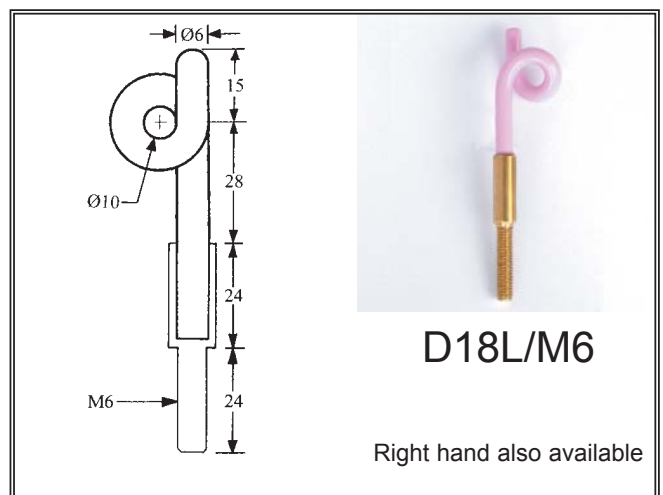
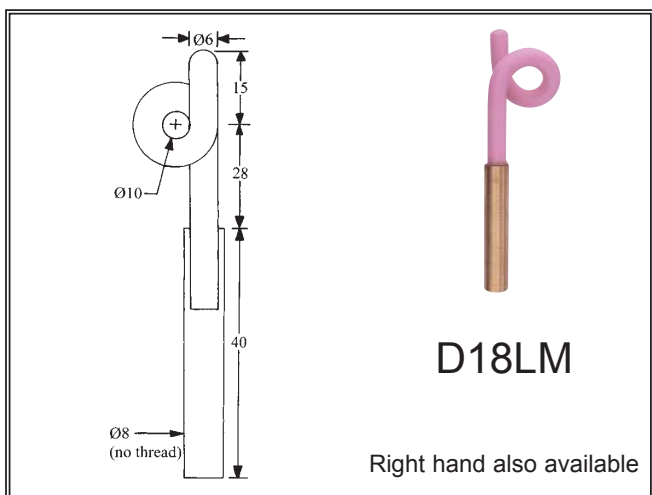
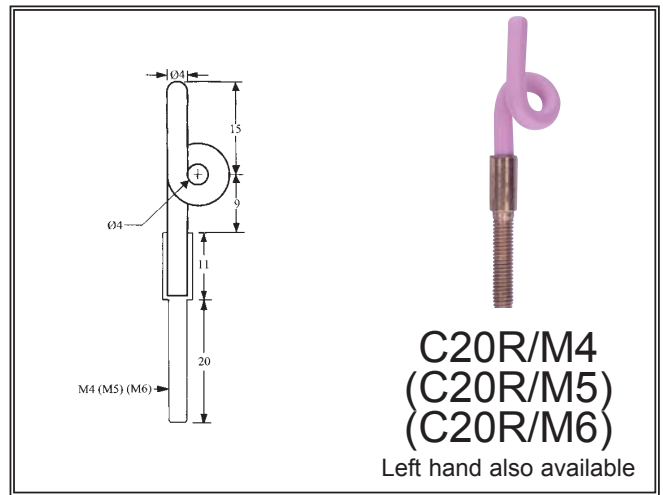
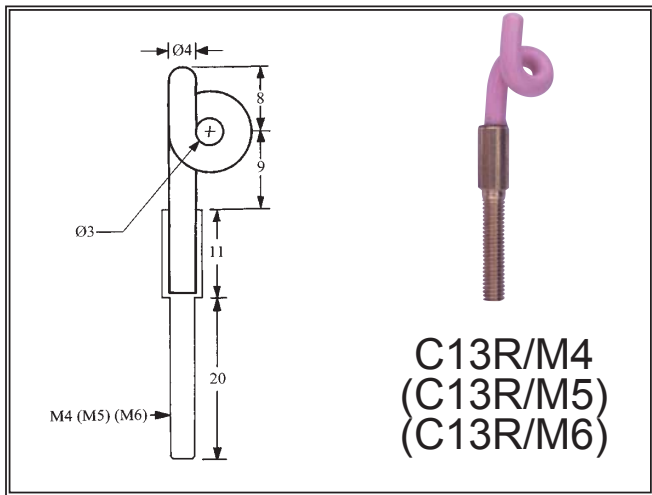
|     | No. of Yarn Grooves |
|-----|---------------------|
| H59 | 0                   |
| H60 | 4                   |
| H63 | 8                   |

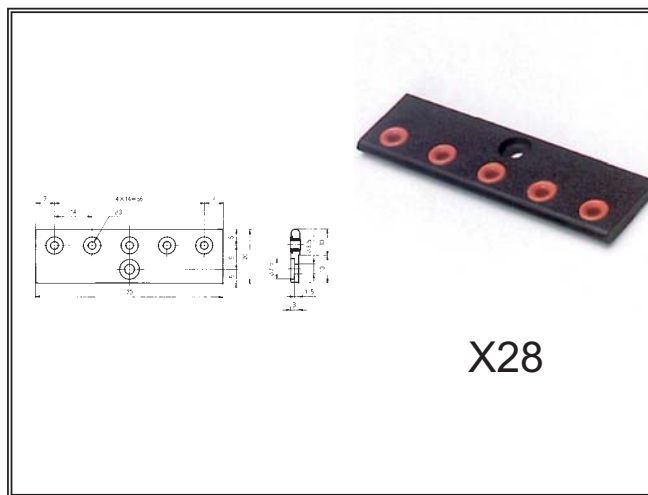
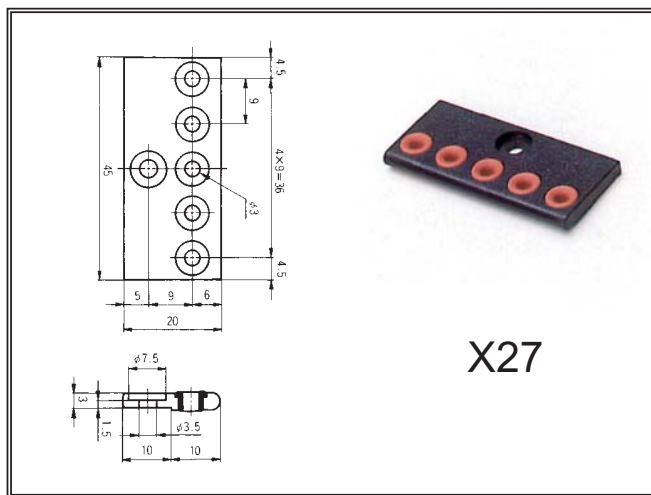
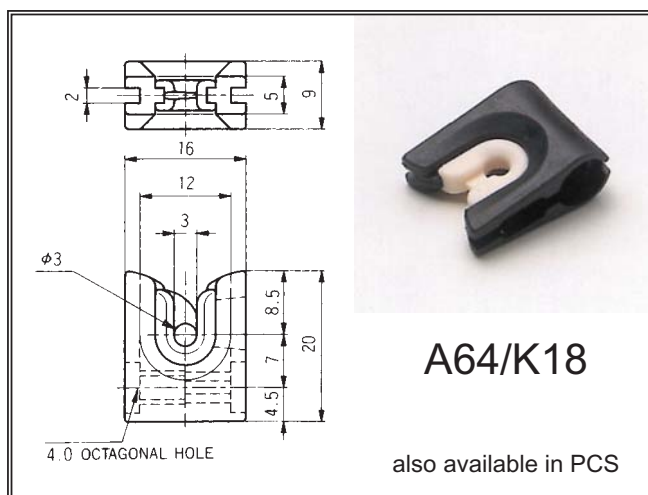
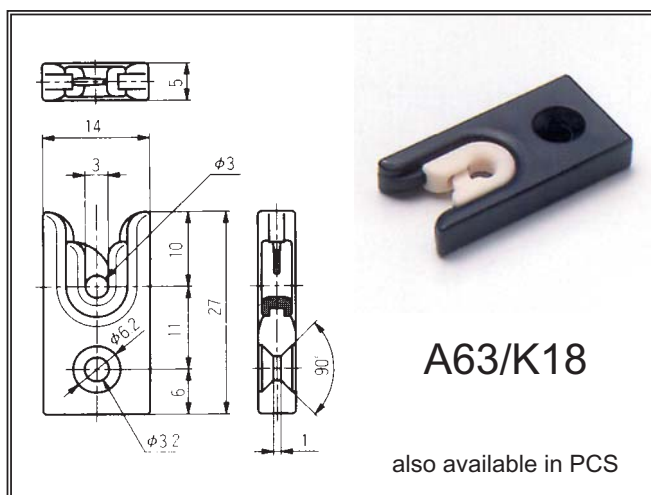
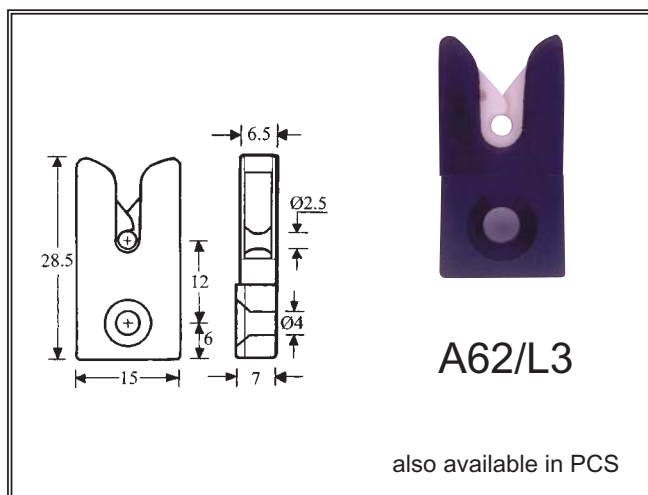
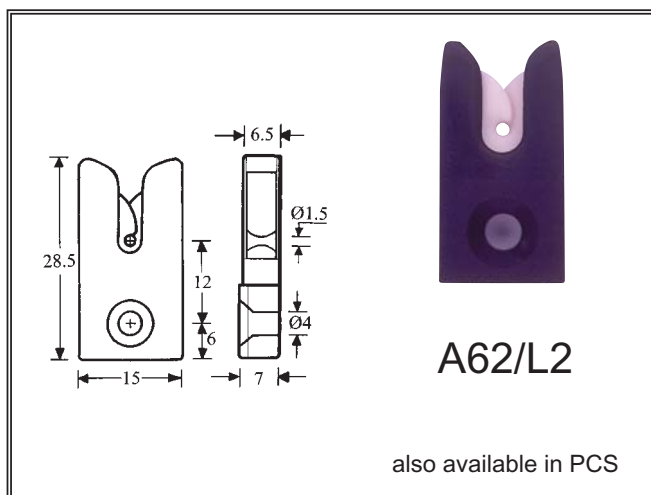
Hx x M  
(standard)  
Hx x M1  
(with tube eyelet)





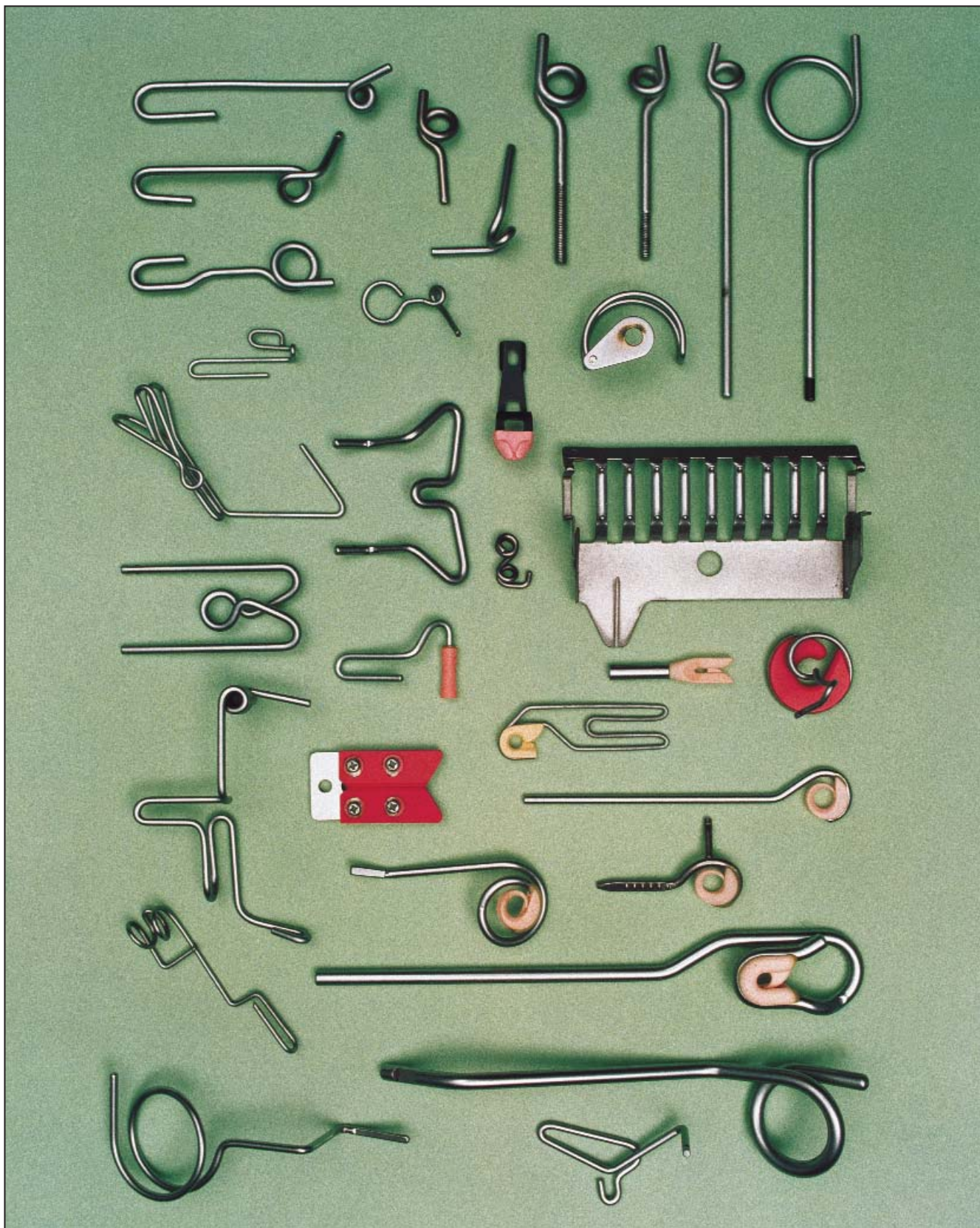








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# TENSIONERS



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"TENSION DEVICES AND OTHER ACCESSORIES"

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|               |    |
|---------------|----|
| A21/E088      | 60 |
| A21/K18       | 60 |
| A22/G42       | 62 |
| A27/E831      | 62 |
| A27/F15 x 1.0 | 62 |
| A27/K24       | 62 |
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