

Celcon® Acetal Copolymer Grade SR90

Chair Base Cap

Typical Related Applications Requiring Good Resistance to Mar, Abrasion, Scratching, Scuffing, Staining and Impact; Excellent Colorability and Good Snap Fit Characteristics:

- Chair arms
- Automotive door kick-push plates and panels
- Luggage casings
- Appliance housings

Requirements

An American office furniture manufacturer was looking for a material for a chair base cap. The base cap is used as a shroud which is snap fit over the structural steel base to conceal it and enhance the overall appearance of the chair. The base cap also needs to maintain its appearance by withstanding surface mars that may occur during transportation or consumer use. The ability to resist marring and scuffing would give the furniture the quality image which the manufacturer was seeking.

Material Evaluation

Since the base cap is a decorative part of a furniture application, it requires a material with an excellent surface appearance that is also mar/abrasion resistant to prevent scuffing caused by the shoes of those sitting in the chair. Because the base cap is designed to snap fit over the chair base, the material selected must also have the right balance of strength, lubricity and resilience needed for this type of assembly.



An American office furniture manufacturer chose Celcon® SR90 for its chair base cap because of its excellent strength, colorability, impact resistance and ability to maintain its new appearance.

Impact resistance was also important because items may be dropped on the base cap, or the chair may be forced against a wall. The furniture manufacturer conducted two variations of an internal test for impact resistance. The tests varied in the size of the arc through which a pendulum with a ten pound weight moved before contact: a 90° arc and a 180° arc.

The furniture manufacturer also conducted stain tests using substances such as coffee and tea that sometimes spill in office environments. The plastics were visually rated based on their appearance after exposure to the substance.

The furniture manufacturer also field tested chairs in high usage areas with base caps made from several materials. Three of the top materials considered for the chair base cap included Celcon® acetal copolymer grade SR90, polypropylene (PP), and modified polyphenylene oxide (PPO). After three months in the field, the appearance of the base caps was evaluated for resistance to scuffing, marring and scratching.

Results

The furniture manufacturer specified Celcon SR90 as the material of choice for the chair pedestal base cap, because it resists surface scuffing, scratching, marring and impact. Celcon SR90 base caps keep their new look and provide customers with a superior value because of the following performance advantages:

- Celcon SR90 performed better than the other materials tested in the furniture manufacturer's three month field test. Polypropylene exhibited significant scratch marks and white scuff marks on dark colored base caps.
- Mar and sandpaper abrasion testing led to a minimal change in gloss on test parts made of Celcon SR90. Both polyphenylene oxide and polypropylene exhibited significant changes in gloss during mar and abrasion testing. Because the furniture appearance is a key quality feature, the manufacturer did not want to use materials like polypropylene or modified polyphenylene oxide which exhibited significant gloss changes during testing.

- Celcon SR90 passed the furniture manufacturer's impact tests, described in the material evaluation section of this document.
- Celcon SR90 performed best in the furniture manufacturer's internal stain resistance test. After exposing base caps to water-based solutions such as coffee and tea the furniture manufacturer reported that the ones made from Celcon SR90 maintained their appearance better than those made from polypropylene or polyphenylene oxide.
- Celcon SR90 has good colorability, can be pre-colored to any opaque shade, and is used in various colors for the base. The color of the bases made from Celcon SR90 acetal copolymer is matched to other parts of the chair.
- The snap fit operation in assembling the base caps is made smooth when Celcon SR90 is used. Some of the physical and mechanical properties of this material, such as its coefficient of friction and flexural modulus, make a smooth assembly and strong joint possible.

For more information about Celcon acetal grade SR90, call 1-800-833-4882 and mention "Application Sheet 95-01".

Some relevant properties of Celcon® acetal copolymer vs. competitive materials

Property/Test	Celcon SR90	Modified PPO	PP	Significance
Tensile Strength (psi)	6,000	5,200	3,900	The tensile strength and flexural modulus of Celcon SR90 acetal copolymer are well suited for snap fit applications.
Flexural Modulus (psi)	220,000	260,500	180,500	
Scratch Test Width value (mm)	1.0	1.3	1.7	Materials with lower scratch width values are more resistant to scratching and are more likely to maintain a scratch free surface.
Sandpaper Abrasion (Gloss Change)	1.0	1.8	2.7	Materials with lower gloss change values will be more likely to resist gloss change from abrasive shoe contact with base caps.
Hardness (Rockwell R Scale)	108	94	80	Base cap materials with higher hardness values are less likely to be indented or scratched when objects are pressed against the surface.
Coefficient of Friction against steel	0.24	0.35	0.30	Materials with lower coefficients of friction allow for a smoother snap fit operation.

World-Class Engineering Polymers

- Celanex® thermoplastic polyester (PBT)
- **Celcon® and Hostaform® acetal copolymer (POM)**
- Celstran® and Compel® long fiber reinforced thermoplastics (LFRT)
- Fortron® polyphenylene sulfide (PPS)
- GUR® ultra-high molecular weight polyethylene (UHMW-PE)
- Impet® thermoplastic polyester (PET)
- Riteflex® thermoplastic polyester elastomer (TPC-ET)
- Vandar® thermoplastic polyester alloy (PBT)
- Vectra® liquid crystal polymer (LCP)

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