

Product Cut Sheet: Chain Operated Platinum Series Clutch Mechanism

The heavy-duty chain operated clutch mechanism allows one to position the roller shade with precise accuracy. The bi-directional clutch never needs adjustment. When the operator stops pulling on the bead chain, the clutch stops automatically, holding the shade in the exact position desired. The Platinum Series Contract clutch mechanism is manufactured from PA6 with glass fiber.

Features:

- 1/8" Thick Steel Bracket
- Clutch Fixed to Installation Bracket
- Fascia Valance does not require a notch for the chain to drop through
- #10 Qualified Stainless Steel Bead Chain may be offset
- Idler End Bracket has a height leveling adjustment
- Idler End Bracket has a ball bearing idler for quiet and ultra smooth rotation
- Idler End Cap is spring loaded and retractable for simple and easy installation

Platinum Series Contract Clutch

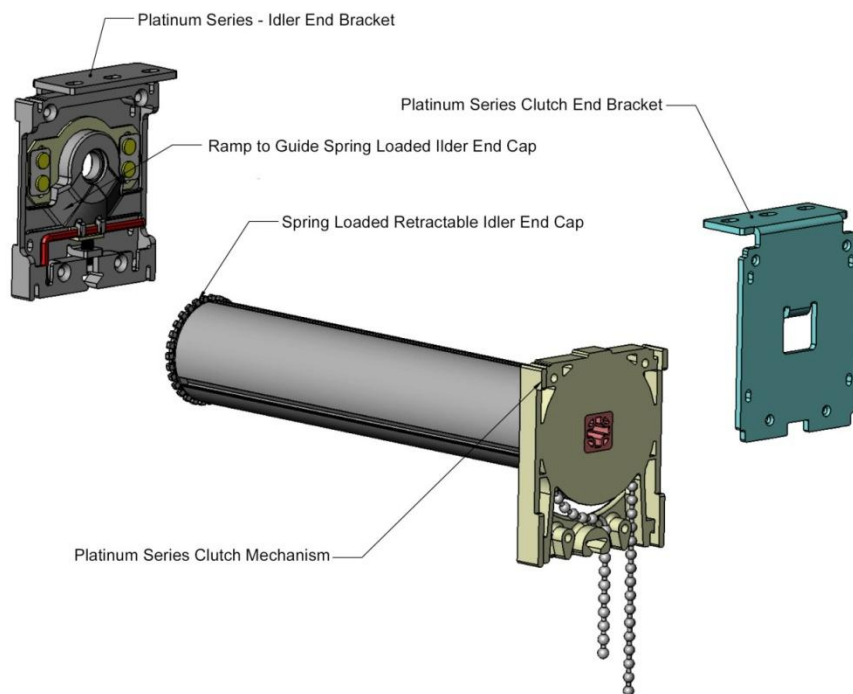


Diagram of Clutch Bracket

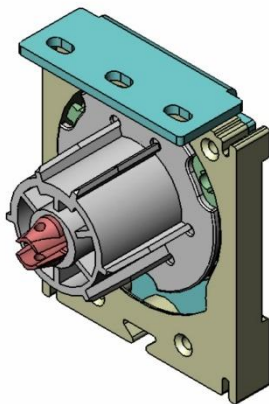
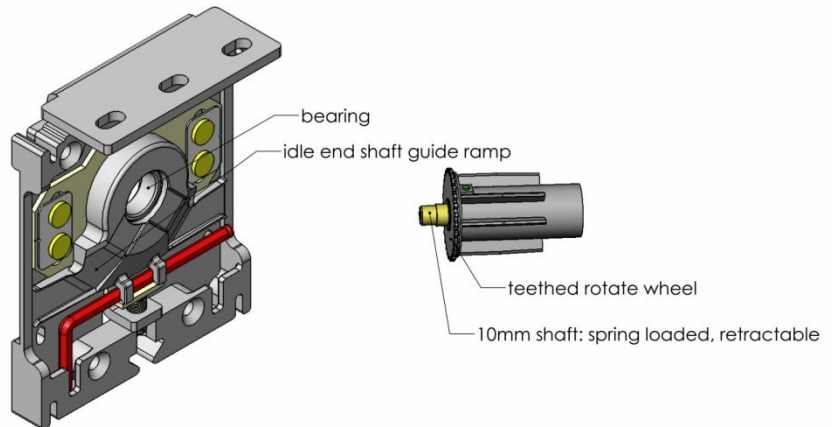
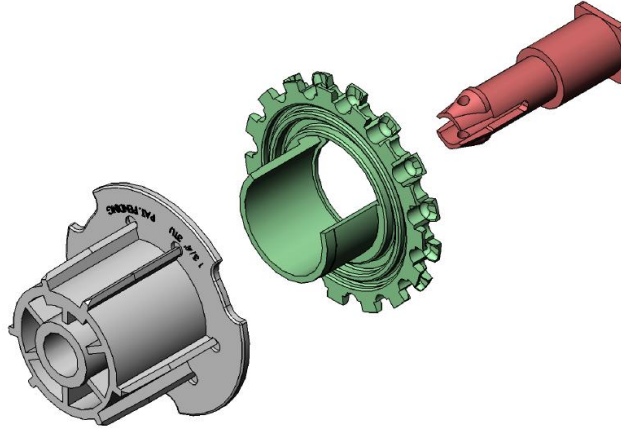


Diagram of Idler Bracket



Platinum Series Clutch Specifications – Components with PA6 Glass Fiber



PROPERTIES & AVERAGE VALUES OF INJECTION MOLDED SPECIMENS

PERMANENCE

| | English | SI Metric | ASTM TEST |
|--|-----------------------|---------------|-----------|
| Primary Additive | 20 % | 20 % | |
| Specific Gravity | 1.31 | 1.31 | D 792 |
| Molding Shrinkage 1/8 in (3.2 mm) section | 0.0020 - 0.0040 in/in | 0.20 - 0.40 % | D 955 |

MECHANICAL

| | | | |
|-----------------------------------|----------------------------|-------------|--------|
| Impact Strength, Izod | | | |
| notched 1/8 in (3.2 mm) section | 1.5 ft-lbs/in | 80 J/m | D 256 |
| unnotched 1/8 in (3.2 mm) section | 10.0 ft-lbs/in | 534 J/m | D 4812 |
| Tensile Strength | 15000 psi | 103 MPa | D 638 |
| Tensile Elongation | 1.0 - 3.0 % | 1.0 - 3.0 % | D 638 |
| Tensile Modulus | 0.85 x 10 ⁶ psi | 5861 MPa | D 638 |
| Flexural Strength | 25000 psi | 172 MPa | D 790 |
| Flexural Modulus | 0.75 x 10 ⁶ psi | 5171 MPa | D 790 |

ELECTRICAL

| | | | |
|-------------------------------------|--------------|--------------|--------------------|
| Volume Resistivity | < 1E3 ohm.cm | < 1E3 ohm.cm | D 257 |
| Surface Resistivity | < 1E6 ohm/sq | < 1E6 ohm/sq | D 257 |
| Surface Resistance | < 1E5 ohm | < 1E5 ohm | ESD S11.11 |
| Static Decay | | | ESD S11.11 |
| MIL-PRF-81705D, 5kV to 50 V, 12% RH | < 2.00 s | < 2.00 s | FTMS101C 4046.1 |

GENERAL PROCESSING FOR INJECTION MOLDING

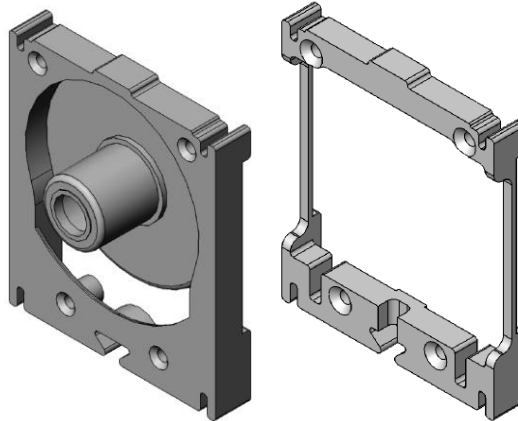
| | | |
|--------------------|-------------------|---------------|
| Injection Pressure | 10000 - 15000 psi | 69 - 103 MPa |
| Melt Temperature | 470 - 535 °F | 243 - 279 °C |
| Mold Temperature | 130 - 200 °F | 54 - 93 °C |
| Drying | 2 hrs @ 180 °F | 2 hrs @ 82 °C |
| Moisture Content | 0.20 % | 0.20 % |
| Dew Point | 0 °F | -18 °C |

Platinum Series Clutch Specifications – Spring Components



Stainless Steel Spring

1. Material: Music wire
2. Specification: ASTM A 228-02 CHEM ONLY
3. Chemical Properties:
 - C: 0.81%
 - CR: 0%
 - MN: 0.51%
 - NI : 0%
 - P : 0.011%
 - S : 0.006%
 - SI: 0.21%
4. Tensile:
5. Rockwell : RC 41
6. Heat treating: Stress relieve at 232°C Min.



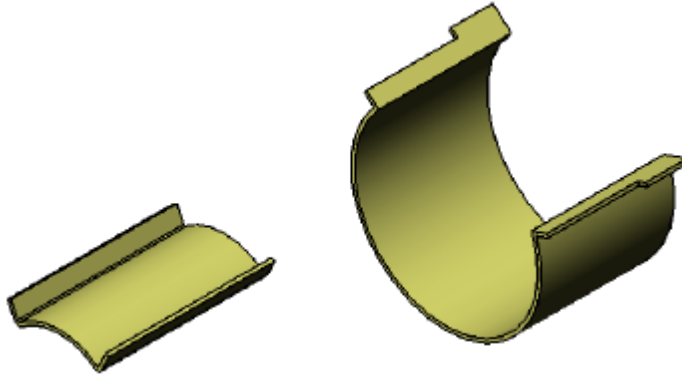
POM

Acetal (POM)

PROPERTIES & AVERAGE VALUES OF INJECTION MOLDED SPECIMENS

| | English | SI Metric | ASTM TEST |
|---|----------------------------|----------------|--------------------|
| PERMANENCE | | | |
| Specific Gravity | 1.36 | 1.36 | D 792 |
| Molding Shrinkage | | | |
| 1/8 in (3.2 mm) section | 0.0170 - 0.0250 in/in | 1.70 - 2.50 % | D 955 |
| MECHANICAL | | | |
| Impact Strength, Izod | | | |
| notched 1/8 in (3.2 mm) section | 1.0 ft-lbs/in | 53 J/m | D 256 |
| unnotched 1/8 in (3.2 mm) section | 10.0 ft-lbs/in | 534 J/m | D 4812 |
| Tensile Strength | 6000 psi | 41 MPa | D 638 |
| Tensile Elongation | 7.0 - 10.0 % | 7.0 - 10.0 % | D 638 |
| Tensile Modulus | 0.25 x 10 ⁶ psi | 1724 MPa | D 638 |
| Flexural Strength | 9000 psi | 62 MPa | D 790 |
| Flexural Modulus | 0.30 x 10 ⁶ psi | 2068 MPa | D 790 |
| ELECTRICAL | | | |
| Volume Resistivity | < 1E4 ohm.cm | < 1E4 ohm.cm | D 257 |
| Surface Resistivity | < 1E7 ohm/sq | < 1E7 ohm/sq | D 257 |
| Surface Resistance | < 1E6 ohm | < 1E6 ohm | ESD S11.11 |
| Static Decay | | | ESD S11.11 |
| MIL-PRF-81705D, 5kV to 50 V, 12% RH | < 2.00 s | < 2.00 s | FTMS101C 4046.1 |
| GENERAL PROCESSING FOR INJECTION MOLDING | | | |
| | English | SI Metric | |
| Injection Pressure | 10000 - 15000 psi | 69 - 103 MPa | |
| Melt Temperature | 360 - 425 °F | 182 - 218 °C | |
| Mold Temperature | 175 - 225 °F | 79 - 107 °C | |
| Drying | 2 hrs @ 250 °F | 2 hrs @ 121 °C | |
| Moisture Content | 0.15 % | 0.15 % | |
| Dew Point | -25 °F | -32 °C | |

Platinum Series Clutch Specifications – Spring Shim



1. COMPOSITION

| Grade | | C | Mn | Si | p | S | Cr | Mo | Ni | N |
|-------|-----|------|-----|------|-------|------|------|------|------|------|
| 316 | Min | - | - | - | 0 | - | 16.0 | 2.00 | 10.0 | - |
| | Max | 0.08 | 2.0 | 0.75 | 0.045 | 0.03 | 18.0 | 3.00 | 14.0 | 0.10 |

2. MECHANICAL PROPERTIES

| Grade | Tensile Str (MPa)min | Yield Str 0.2% Proof (MPa)min | Elong(% in 50mm) min | Hardness | |
|-------|----------------------|-------------------------------|----------------------|-----------------------|-----------------|
| | | | | Rockwell B (HR B) max | Brinell(HB) max |
| 316 | 515 | 205 | 40 | 95 | 217 |

3. PHYSICAL PROPERTIES

| Grade | Density (kg/m ³) | Elastic Modulus (GPa) | Mean Co-eff of Thermal Expansion (μm/m/°C) | | | Thermal Conductivity (W/m.k) | | Specific Heat 0-100°C(J/kg.k) | Elec Resistive(n Ω.m) |
|-------|------------------------------|-----------------------|--|----------|----------|------------------------------|-----------|-------------------------------|-----------------------|
| | | | 0-100 °C | 0-315 °C | 0-538 °C | At 100 °C | At 500 °C | | |
| 316 | 800 | 193 | 15.9 | 16.2 | 17.5 | 16.3 | 21.5 | 500 | 740 |

4. CHEMICAL PROPERTIES

- | | | | |
|--------------|---------------|---------------|------------|
| • Fe, <0.03% | • C, 16-18.5% | • Cr, 10-14% | • Ni, 2-3% |
| • Mo, <2% | • , Mn, <1% | • Si, <0.045% | • p<0.03% |
| • s | | | |

TESTING AND QUALITY CONTROL

- ✓ ZMC is involved in developing systems to ensure our products are designed and produced to meet and exceed our customer requirements.
- ✓ ZMC's quality control tests will determine the durability and longevity of our clutches to offer you the best quality in the market at affordable prices.

A. PULL APART TEST

- a) A piece of plastic is taken from the clutch and placed between two holders.
- b) The holders will pull apart the plastic and determine the force needed to break it.
- c) The results are recorded on every step of the test for further evaluation

B. IMPACT TEST

- a) A high force over a short time is applied to the clutch components to determine how much pressure they can stand

C. SHEER TEST

- a) Determines how much load the clutch components can stand

D. DUROMETER

- a) This hardness test measures the depth of the indentation in the material by a given force.

E. CLUTCH PERFORMANCE AND LOAD TEST

- a) Load test is the process of creating demand on a device and measuring its response. The performance testing covers a broad range of engineering evaluations where our products are specified on their final measurable performance characteristics.
- b) The clutch performance is tested with 0 weight and the reading of the pull force required to raise and lower the blind is obtained.
- c) Five pounds are added and the evaluating results are recorded.
- d) The test will be performed adding 5 pounds then 1 pound at a time until it reaches the maximum weight stand by the clutch.

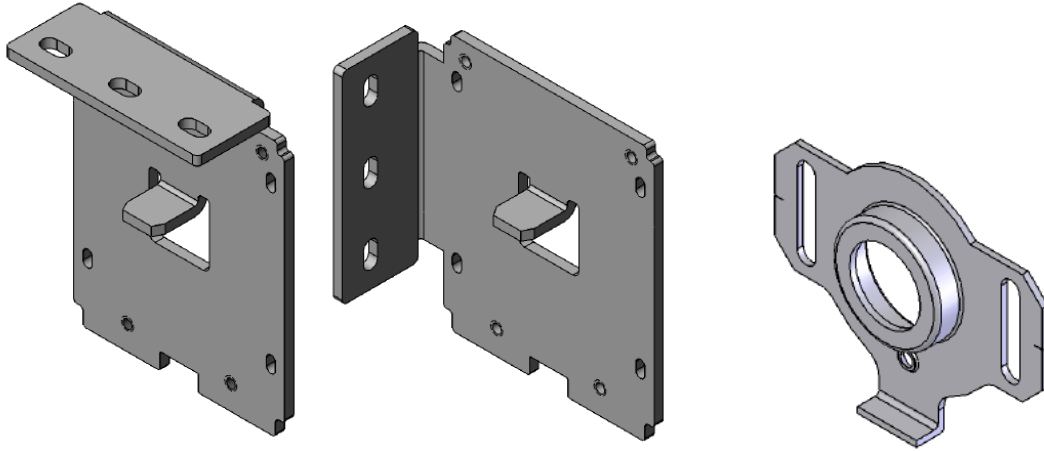
F. CLUTCH ENDURANCE TEST

- a) This test determines the performance of the clutch during its lifetime
- b) How much wear and fatigue is incurred over its lifetime
- c) The test is carried out for over 1 week of continuing cycling and it equals to 13 years of use
- d) The same clutches will go back to the "Clutch Performance and Load Test". Our records indicate that our clutches will still have the same performance and strength.

G. ONGOING TEST

- a) Testing for noise and smooth performance of the clutches with different types of ball chains.

Platinum Series Clutch Specifications – Installation Brackets



1. **Material:**

Cold Rolled Steel Bracket ASTM A1008

2. **Specification:**

ASTM A1008

3. **Physical Properties**

Density

Metric
7.872 g/cc

English
0.2844 lb/in³

4. **Mechanical Properties**

Tensile Strength, Ultimate

Metric
303 - 358 MPa

English
43900 - 51900 psi

Tensile Strength, Yield

180 - 240 MPa

26100 - 34800 psi

Elongation at Break

42.0 - 48.0 %

42.0 - 48.0 %

Modulus of Elasticity

200 GPa

29000 ksi

Bulk Modulus

140 GPa

20300 ksi

Poissons Ratio

0.290

0.290

Machinability

55.0 %

55.0 %

Shear Modulus

80.0 GPa

11600 ksi

5. **Material Components Properties**

Metric

English

Carbon, C

<= 0.100 %

<= 0.100 %

Iron, Fe

99.31 - 99.7 %

99.31 - 99.7 %

Manganese, Mn

0.300 - 0.500 %

0.300 - 0.500 %

Phosphorous, P

<= 0.0400 %

<= 0.0400 %

Sulfur, S

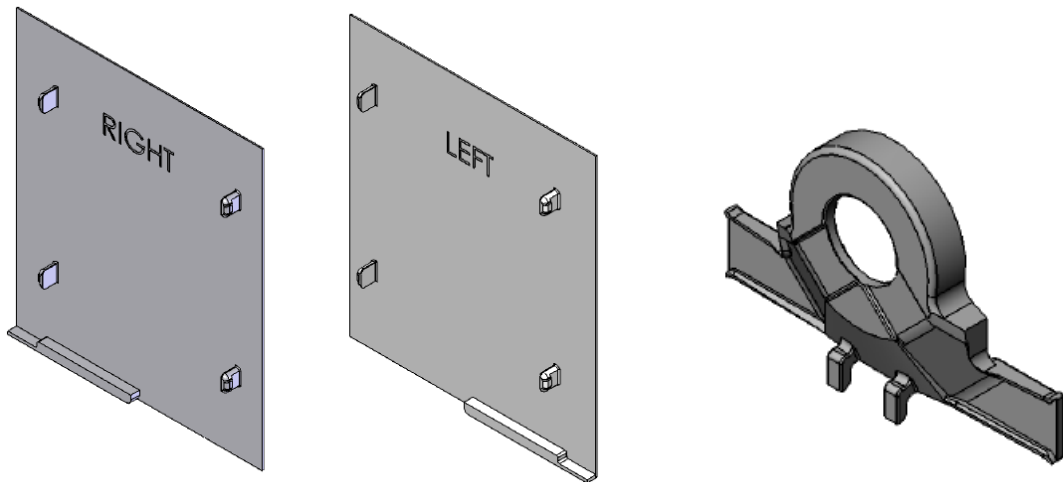
<= 0.0500 %

<= 0.0500 %

6. **Surface Finishes:**

These brackets are Zinc-Plated.

Platinum Series Clutch Specifications – ABS Components



ABS, Acrylonitrile-Butadiene-Styrene

ABS is a "polymerized alloy" of the three materials acrylonitrile, butadiene and styrene. The material is located under the group styrene plastic. Styrene plastics are in volume one of the most used plastics.

| Properties | English | SI |
|------------------------|-------------------------------|--------------------------------------|
| Specific Gravity | 1.04 to 1.11 | 1.03 to 1.11 <i>g/cm³</i> |
| Mold Shrinkage, Flow | 0.00050 to 0.014 <i>in/in</i> | 0.00050 to 0.014 <i>cm/cm</i> |
| Melt Mass Flow Rate | 0.20 to 30 <i>g/10 min</i> | 0.20 to 30 <i>g/10 min</i> |
| Drying Temperature | 176 to 195°F | 79.7 to 90.7°C |
| Drying Time | 2.0 to 3.6 <i>hr</i> | 2.0 to 3.6 <i>hr</i> |
| Suggested Max Moisture | 0.0100 to 0.15% | 0.0100 to 0.15% |
| Suggested Max Re grind | 5 to 20%) | 5 to 20% |
| Injection Pressure | 11700 to 15400 <i>psi</i> | 80.9 to 106 <i>MPa</i> |
| Rear Temperature | 338 to 478°F | 170 to 248°C |
| Middle Temperature | 398 to 466°F | 203 to 241°C |
| Front Temperature | 379 to 491°F | 193 to 255°C |
| Nozzle Temperature | 371 to 501°F | 188 to 260°C |
| Processing (Melt) Temp | 434 to 475°F | 224 to 246°C |
| Mold Temperature | 121 to 168°F | 49.2 to 75.4°C |

Application

ABS is used for auto body parts, suitcases, toys etc. Extruded profiles, tubes and bolts can be made from ABS when the requirements are high impact resistance and a nice surface.