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- T-Slot and Profile Covers
- Conduit Profiles
- Conduit End Caps

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Services,
Tips & Tools

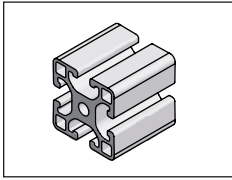
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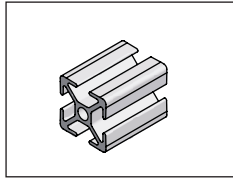
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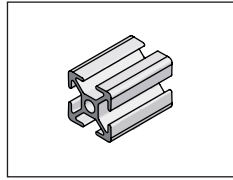
Section 1 – Profiles



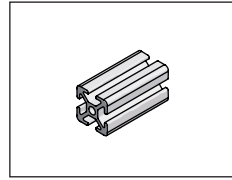
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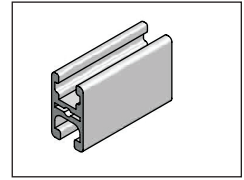
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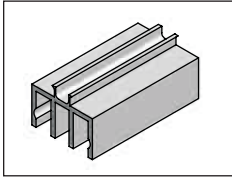
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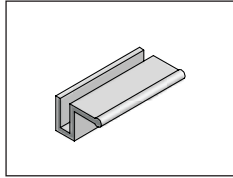
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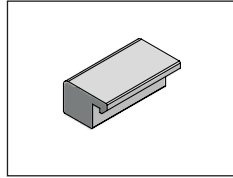
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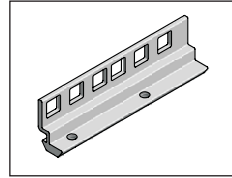
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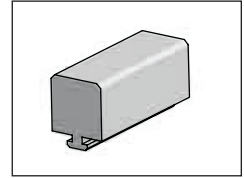
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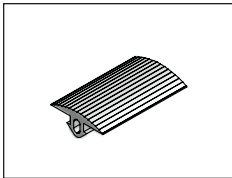
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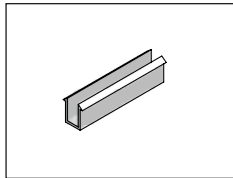
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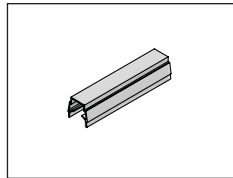
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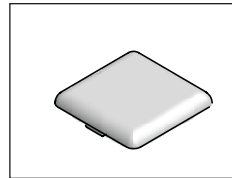
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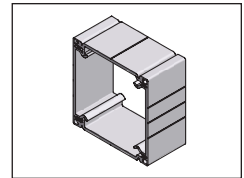
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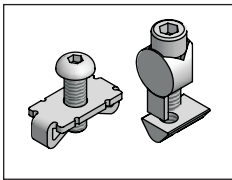


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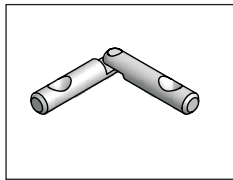


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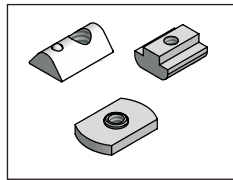
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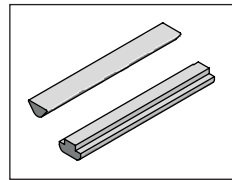
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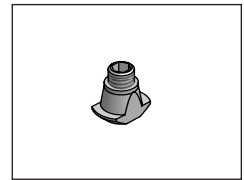
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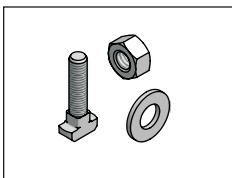
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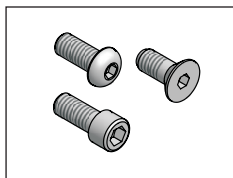
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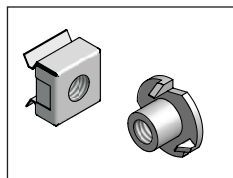
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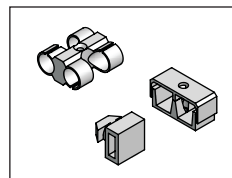
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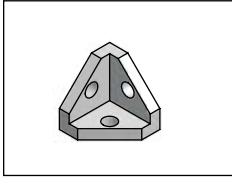


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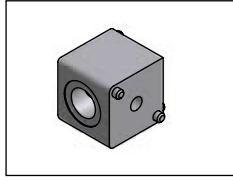


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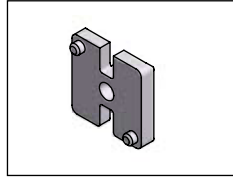
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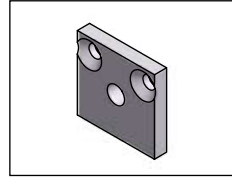
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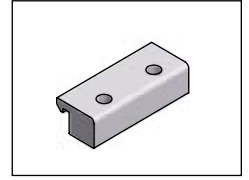
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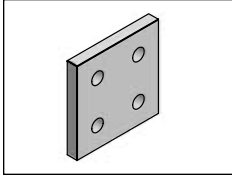
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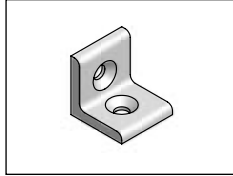
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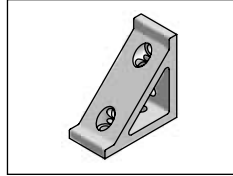
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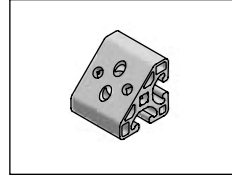
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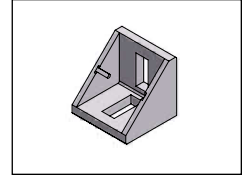
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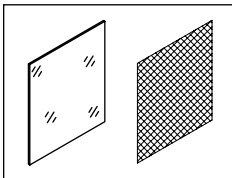


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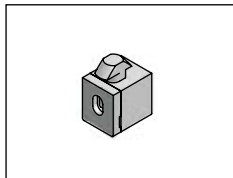


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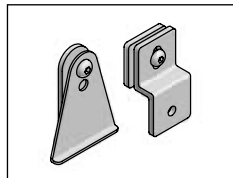
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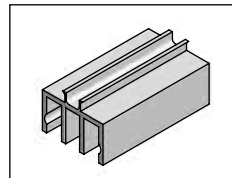
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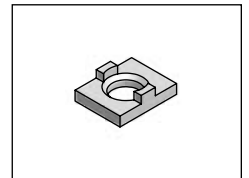
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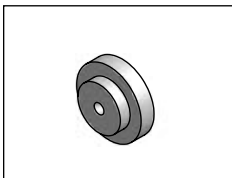
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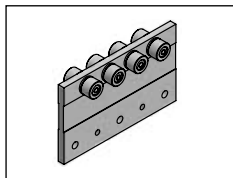
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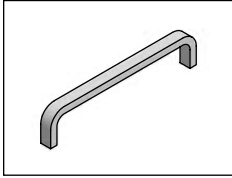


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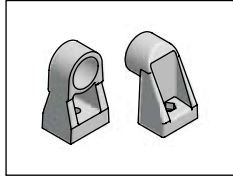


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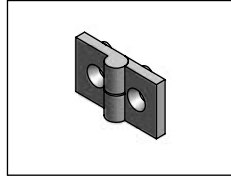
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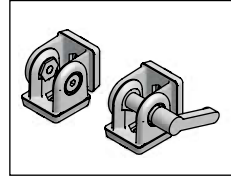
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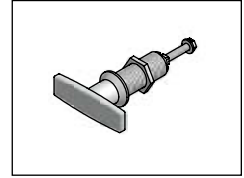
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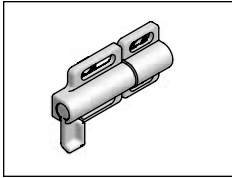
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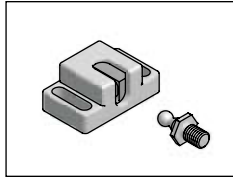
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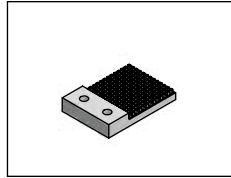
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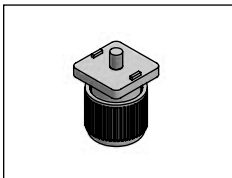


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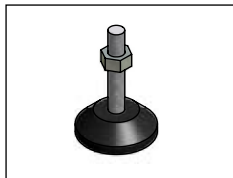


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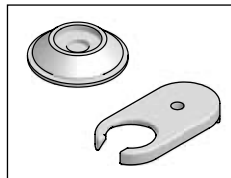
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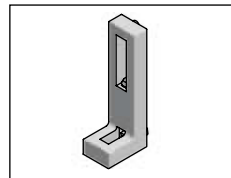
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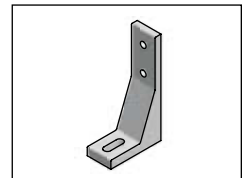
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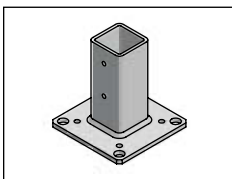
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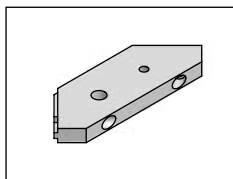
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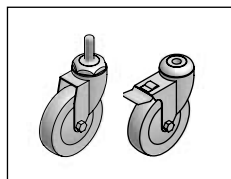
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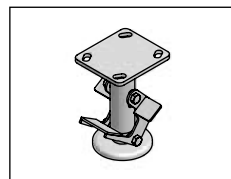
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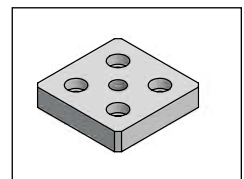
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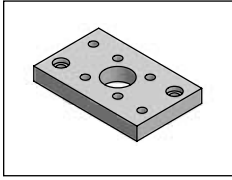


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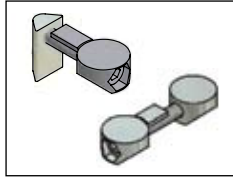


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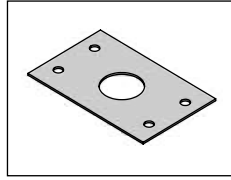
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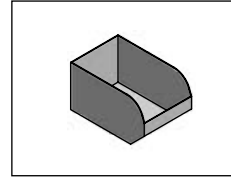
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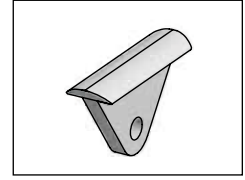
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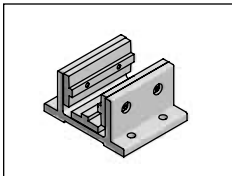


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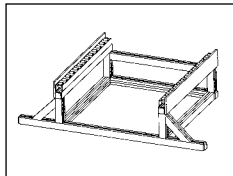


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Section 9 – Services, Assembly Tips & Tools

Section 10 – Index and Offer of Sale

Product Information

Each product page in the catalog includes:

- application information and examples
- technical information
- dimensions
- how to assemble
- recommended fasteners, if applicable
- ordering information (part #, unit and weight)


Profile Compatibility

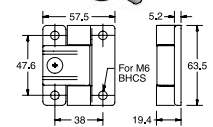
As a quick reference for product compatibility, the Ordering Information section groups product by profile series. Additional information can be found in the applications drawings associated. Where available, the Recommended Hardware section will highlight the necessary hardware components based on the profile series application.

Contact your Parker IPS Service Center or Customer Service to discuss specials or applications not found in this catalog.

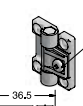
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Hinges
Industrial Profile Systems
Handles, Hinges & Switches

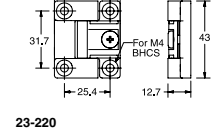
Adjustable

3D View → 

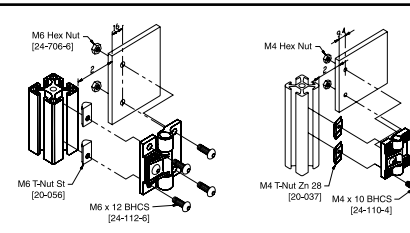
Dimensions → 

Part # → 23-222

Application Information → 



23-220



Application
Adjustable tension hinge for swinging doors to hold door open, partially open or closed. Can also adjust speed of opening or closing.

Technical Data
Acetal, Black
Polycarbonate hinge pin
Maximum Torque: 23-220 80 Ncm
23-200 400 Ncm

Recommended Fastening Hardware (Order Separately)

23-222
 Profile to Panel
 Screws (2) M6x12 BHCS [24-112-6]
 (2) M6 sized for panel thickness
 T-Nut (2) M6 Standard T-Nut [20-056]
 Hex Nut (2) M6 Hex Nut [24-706-6]
 Profile to Profile
 Screws (4) M6x12 BHCS [24-112-6]
 T-Nut (4) M6 Standard T-Nut [20-056]

23-220
 Profile to Panel
 Screws (2) M4x10 BHCS [24-110-4]
 (2) M4 sized for panel thickness
 T-Nut (2) M4 T-Nut Zn [20-037]
 Hex Nut (2) M4 Hex Nut [24-706-4]
 Profile to Profile
 Screws (4) M4x10 BHCS [24-110-4]
 T-Nut (4) M4 T-Nut Zn [20-037]

Ordering Information


| Description | Unit | Weight | Part # |
|--------------------|------|--------|--------|
| Adjustable Hinge 1 | Each | 38 g | 23-220 |
| Adjustable Hinge 2 | Each | 42 g | 23-222 |

How to Assemble ←

Technical Data ←

Recommended Fastening Hardware ←

Ordering Information ←



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Parker Hannifin Corporation
 Industrial Profile Systems
 Wadsworth, Ohio USA

Ordering Choices



Parker offers several ways to order Inch product so that you can choose a level of service to suit your needs. You can order everything from a bundle of uncut profiles to a completely assembled structure.

- **Bundles** – IPS mSeries product line can be ordered as bundles of profiles and packages of fasteners and accessories to machine and assemble at your location.
- **UPS Shipping Requirements** – IPS mSeries profiles can be shipped via UPS Air if they are cut to 8' (2.4m) length max and each package does not exceed 70 lbs (31kg). Cut charges will apply.
- **Kits** – IPS mSeries product line can be ordered in a kit form where the profiles are cut and machined to order and fasteners and accessories are included based on a parts list. This kit can be assembled at your location.
- **Complete Assembly** – IPS mSeries product line can be ordered completely assembled and shipped as an assembled unit. Shipping costs should be a consideration when using this method.

Machining Services

- **Order cut to size** – specify the length in millimeters or decimal meter dimensions. Example: 1500mm or 1.5meters. See the conversion chart for fraction to decimal conversions. A cut charge will be included with cut to size lengths.
- **Additional machining** should also be specified along with the profile if it is required for fasteners or accessories. Standard machining options include tapping, drilling, and counter boring. See machining services pages in this catalog for correct part numbers. Any additional custom machining can be done by our expert machinists to ensure that your design is complete and to your requirements.
- **Cut to length tolerance** is $\pm .40\text{mm}$ [$\pm .015$ "].

Choosing a Fastener/Accessory

What aspect is critical for fastening?

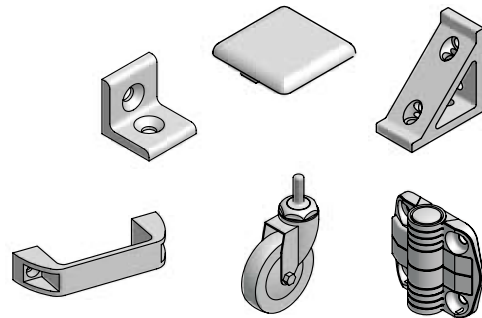
- Aesthetics/hidden (standard fastener, universal)
- Strength (universal fastener, standard)
- Ease-of-assembly/no machining (joining plate, gussets)
- Adjustability (gussets, angle bracket, universal)

When ordering universal fasteners or standard fasteners, machining operations are required for the fastener to work in a profile. Part numbers and descriptions for machining operations are found in the machining services section of the catalog.

Choices of Accessories

A full range of accessories are available to complete an assembly:

- T-slot covers
- end caps
- brackets and gussets
- joining and base plates
- casters
- hinges
- handles



What aspect is critical for accessories?

Parker offers a wide range of accessories to provide the right part for the special considerations of your application.

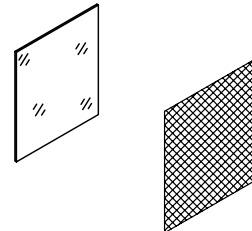
- Aesthetics
- Ease-of-assembly
- Load on structure/accessory
- Functionality

Panels & Wire Mesh

Panels and Wire mesh can be ordered as a full sheet or cut to a specified dimension in square meters. When ordering full sheets, please add a P to the end of the part number that you are ordering (e.g. 26-790-6P)

Standard panel choices include:

- Polycarbonate
- TRESPA®
- Expanded PVC
- PVC coated wire mesh
- Aluminum Composite



Specialty panels of any material can be ordered for any project. Additional time may be required to expedite any specials.

Mechanical Properties

- All structural IPS profiles are prime aluminum, mill-certified with metallurgical properties of 6105-T5, 6005-T5, 6061-T6 or 6063-T6 specifications.
 - Yield (0.2 limit) Rm min. 240 N/mm² (35,000 psi)
 - Tensile strength Rm min. 260 N/mm² (38,000 psi)
- Note: Cross sectional thickness variations of the profiles may influence yield and tensile strength.
- Elongation for 2 in. long specimens:
 6005-T5 (thickness up thru 0.124 in), 6061-T6 (up thru 0.249 in), 6105-T5 (up thru 0.5 in) – 8% min
 6005-T5 (thickness 0.125-1 in.), 6061-T6 (0.25 in. and over) – 10% min
 - Elasticity E approximately 70,000 N/mm² (10,150 kpsi)
 - Brinell Hardness approximately 75 HB 2.5/187.5
 - The molecular structure of the 6005-T5 alloy is generally stable in an ambient temperature range of:
 -40°C to +200°C (-40°F to +392°F)
 Extreme temperature fluctuations may change the mechanical properties.

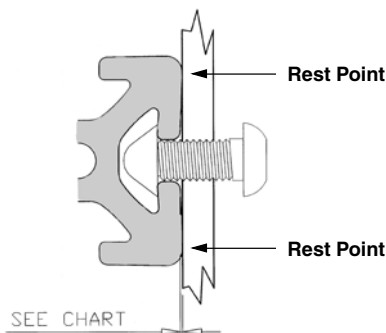
Profile Finish

- Clear anodizing: AA M10, C22, A31, Clear
- Black anodizing: AA M10, C22, A34, Black
- Minimum depth: 0.010mm (0.0004 in.)
- Surface hardness: approximately 250 HV, outer surface exposed
- Custom anodizing and protective finishes available

Tolerances

- Outer dimensions depending on size ± (0.2 - 0.6)mm.
- Extrusions conforming to DIN 17 615 specifications and to IPS blueprints.
- Twist per 300mm (1 ft) length not to exceed 0.25° and total twist over 6m (20 ft) length not to exceed 1.5°.
- Flatness 0.10mm (0.004 in) per 25mm (1 in) of width.
- Straightness 0.32mm (0.0125 in) per 300mm (1 ft) of length and not exceeding 3mm (0.12 in) over 6m (20 ft) of extrusion.
 Maximum bow 3mm (0.12 in) over 6m (20 ft).
- Cut to length tolerance ± .40mm [± .015"]

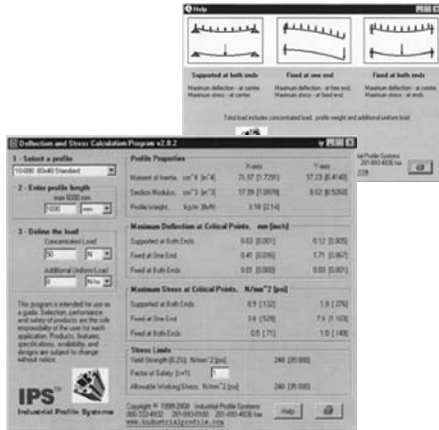
Defined Rest Points



All 40, 30, 28 and 20 series profiles have a taper built-in to the T-slot. Preload in the material elastic range results in a vibration safe connection because the profile is pulled flush with the connecting surface during fastener tightening. The high quality material ensures that the profile T-slot will remember it's original shape if disassembly is required, making all IPS profiles completely reusable.

| Profile Series | Preload Range |
|----------------|---------------|
| 40 | 0.2mm |
| 30 | 0.2mm |
| 28 | 0.2mm |
| 20 | 0.1mm |

Deflection Calculation



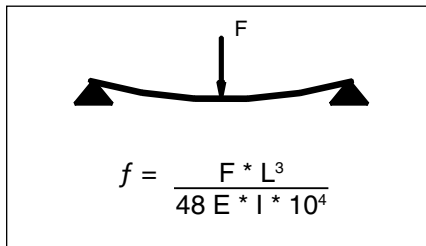
Application

Stand-alone program allows to calculate deflection and stress of IPS aluminum profiles based on profile selection, length and load (evenly distributed and/or concentrated at the critical point). Three cases for the profile attachment are calculated: supported at both ends, fixed at one end, fixed at both ends. Metric or English units of measure can be used to enter profile length and load. Calculated deflection given in both millimeters and inches. Stress values are given in both N/mm² and psi. System requirements: Windows 9x, Windows NT 3.0 or higher, 133MHz, 16MB RAM.

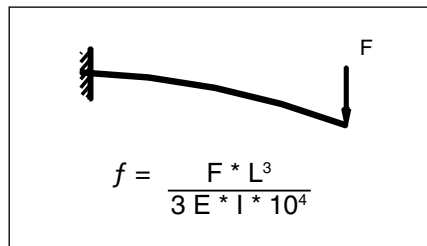
Deflection Program can be downloaded free from www.parkermotion.com/IPS.

Formulas for calculating deflection at critical points

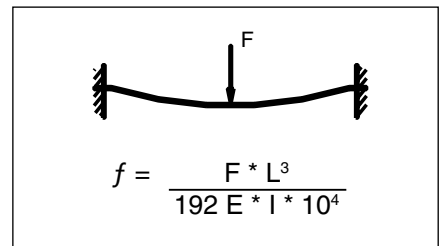
Supported at both ends



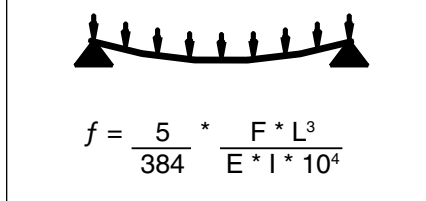
Fixed at one end



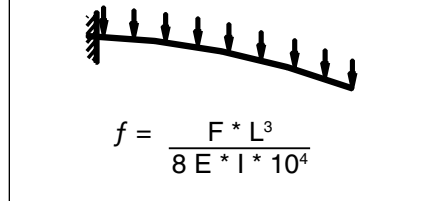
Fixed at both ends



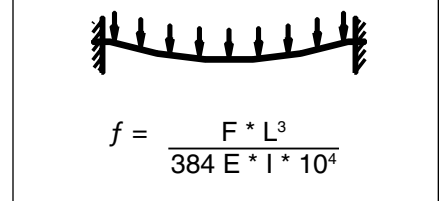
Total Load F



Total Load F



Total Load F



In the formulas:

- f = deflection in mm
- F = load in N
- L = free profile length in mm
- E = Modulus of Elasticity in N/mm²
E_{Al} = 70,000 N/mm²
- I = Moment of inertia in cm⁴

Example

Find the deflection for the following conditions:
80x40 Standard Profile (10-080), upright
I_x = 71.97 cm⁴
m = 3.18 kg/m
L = 1000 mm
F = 50 N - concentrated load
No additional load other than profile weight

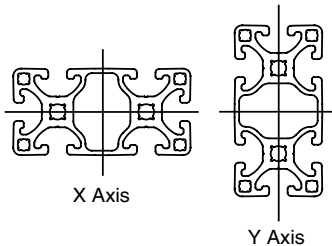
Calculate Profile weight (uniform load)
F_U = m * L * g = (3.18 * 10⁻³) * 1000 * 9.81 = 31.2 N

Total deflection $f_{TOTAL} = f_{CONCENTRATED} + f_{UNIFORM}$

Supported at both ends:
f = 0.021 + 0.008 ≈ 0.03mm

Fixed at one end:
f = 0.331 + 0.077 ≈ 0.041mm

Fixed at both ends:
f = 0.005 + 0.002 ≈ 0.01 mm



Fractions to Decimals

| Fraction | Decimal |
|----------|---------|
| 1/16 | 0.063 |
| 1/8 | 0.125 |
| 3/16 | 0.188 |
| 1/4 | 0.25 |
| 5/16 | 0.313 |
| 3/8 | 0.375 |
| 7/16 | 0.438 |
| 1/2 | 0.50 |
| 9/16 | 0.563 |
| 5/8 | 0.625 |
| 11/16 | 0.688 |
| 3/4 | 0.75 |
| 13/16 | 0.813 |
| 7/8 | 0.875 |
| 15/16 | 0.938 |

Metric/English Conversions

Below is a conversion chart for converting metric and English units of measure for applicable physical conditions with this product line.

| | Multiply | by | To Get |
|-------------------|---------------------|---------|----------------------|
| Linear | mm | 0.03937 | Inches |
| | Inches | 25.4 | mm |
| | cm | 0.3937 | Inches |
| | m (meter) | 3.2808 | Feet |
| | Feet | 0.3048 | m (meters) |
| Area | mm ² | 0.00155 | Inches ² |
| | Inches ² | 645.16 | mm ² |
| Volume | cm ³ | 0.06102 | inches ³ |
| | inches ³ | 16.387 | cm ³ |
| | inches ³ | 0.0165 | liters |
| | Liters | 61.024 | inches ³ |
| Mass | Gram (g) | 0.0353 | Ounce (oz) |
| | Ounce (oz) | 28.329 | Gram (g) |
| | Kilogram (kg) | 2.2046 | Pounds (lb) |
| | Pounds | 0.4536 | Kilograms (kg) |
| Velocity | Meters/Minute | 3.281 | Feet/Minute |
| | Feet/Minute | 0.3048 | Meters/Minute |
| Force | Kilograms-f (kgf) | 9.807 | Newtons (N) |
| | Newtons (N) | 0.10194 | Kilograms-f (kgf) |
| | Pounds-f (lbf) | 4.448 | Newtons (N) |
| | Newtons (N) | 0.2248 | Pounds-f (lbf) |
| Pressure | Bar | 14.5 | PSI |
| | PSI | 0.069 | Bar |
| Torque | Newton-Meters (Nm) | 8.851 | Pound-Inches (lb-in) |
| | Pound-Inches | 0.11298 | Newton-Meters (Nm) |
| Moment of Inertia | cm ⁴ | 0.02403 | inch ⁴ |
| | inch ⁴ | 41.623 | cm ⁴ |



WARNING - USER RESPONSIBILITY

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