

## Excerpts From "A Guide for Selecting Continuous Hinges"

**Foreword**

In 1970, continuous hinge manufacturing members of the Builders Hardware Manufacturers Association, Inc. (**BHMA**) initiated an extensive testing program. It started with in-house testing at two member company facilities and culminated with two phases of testing conducted for the BHMA by the Illinois Institute of Technology (IIT). The findings of the IIT were analyzed by an independent mechanical engineer whose recommendations formed the basis for this guide.

**General****2.1**

The criteria in this guide is based upon yield load and not upon ultimate load (failure). The ratio of ultimate load to yield load is at least 1.5 for all hinges and is a natural safety factor. Impact or shock loads are not included.

**2.2**

Additional safety factors should be considered based on the material requirement. Generally harder materials, or metals, result in stronger hinges.

**Strength Factors****3.1**

Hinges are strongest in horizontal stress when the forces are applied perpendicular to the hinge pin. Hinges are weakest in vertical stress when the forces are applied parallel to the pin.

**3.2**

In horizontal load, the strength per unit of length is constant. The longer the hinge, the stronger it will be.

**3.3**

In vertical load, strength increases with the square of the length.

**3.4**

As the hinge leaf thickness increases, hinge strength increases.

**3.5**

As the diameter of the hinge pin is reduced, hinge strength increases provided the pin diameter is not reduced below twice the thickness of the leaf.

**3.6**

Under vertical stress, shorter hinge knuckles provide greater strength.

**Recommended Selection Criteria****4.1**

When applicable, use a hinge thickness approximately the same as the material to which the hinge is to be attached.

**4.2**

Select hinges with the smallest possible knuckle length and having at least 10 knuckles.

**4.3**

Choose a hinge having the smallest pin diameter (see 3.5) available for the hinge thickness selected.

**4.4**

Apply a hinge with the knuckles always out if the hinge is to be used under horizontal stress only. Using this application, the strength will not vary with the angle of opening.

**4.5**

Lubricating hinges weakens them by a factor of about 25%. Allow a safety factor of 25% if hinges are to be lubricated.

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