

Reli-a-Flex™

Reliance

Precision Mechatronics LLP



www.myostat.ca

Reli-a-Flex™ - Accurate transfer of motion between two shafts



Patented:

- UK No. 2316735
- US No. 6,203,437 B1
- European No. EP 0922168 B1

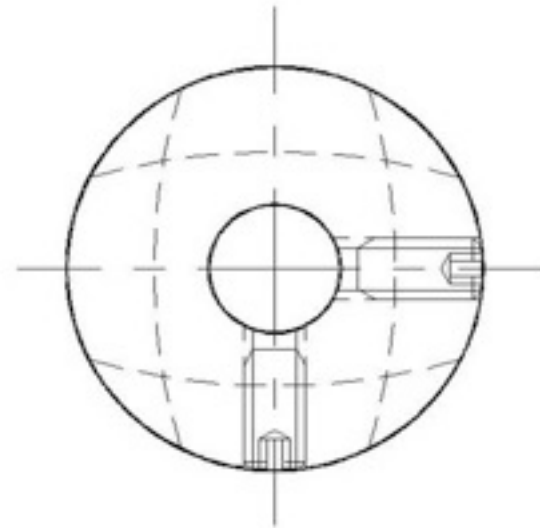
Pending:

- Japanese No. 511360/1998



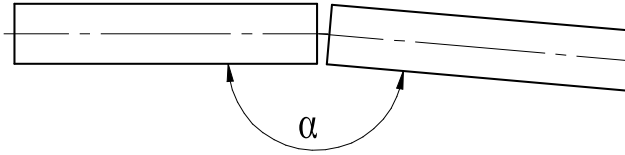
Reli-a-Flex™ - Presentation aims

1. What Reli-a-Flex™ does.
2. How Reli-a-Flex™ achieves its performance.
3. Performance comparisons with other coupling types
4. The present range
5. Future developments

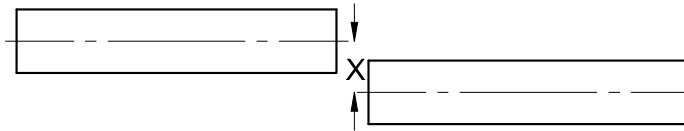


Reli-a-Flex™ - Misalignment capability

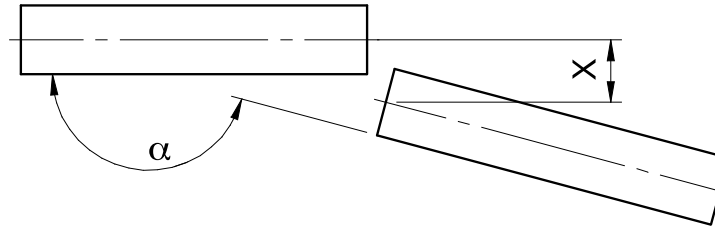
- Angular



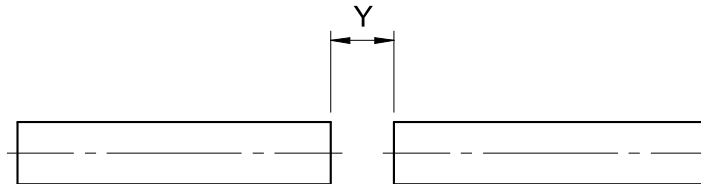
- Parallel



- Compound

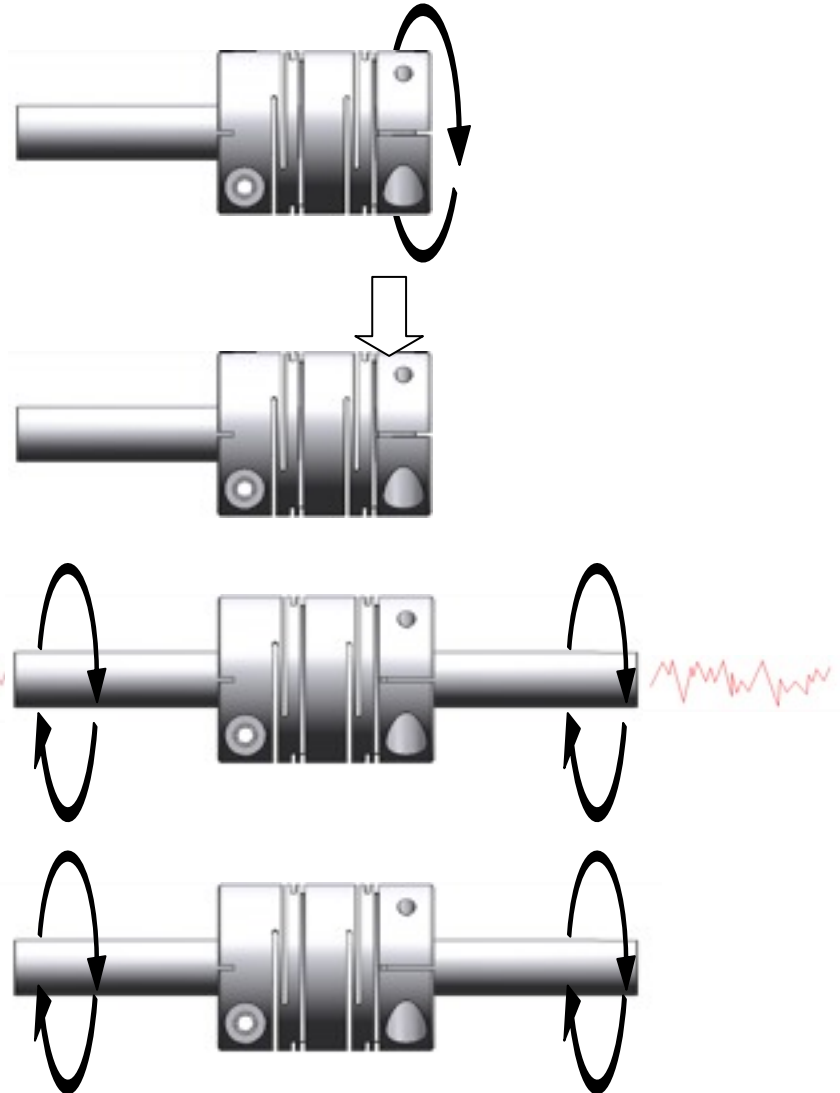


- Axial



Reli-a-Flex™ - Performance parameters

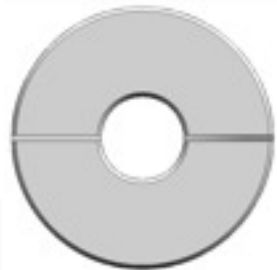
- High torsional stiffness.
 - Low wind-up under load
 - Low bi-directional lost motion
- Low radial stiffness.
 - Minimal bearing loading
- Accurate transmission of motion.
 - Very low velocity errors
 - High bi-directional accuracy
- Long life.
 - Tested to 50million cycles



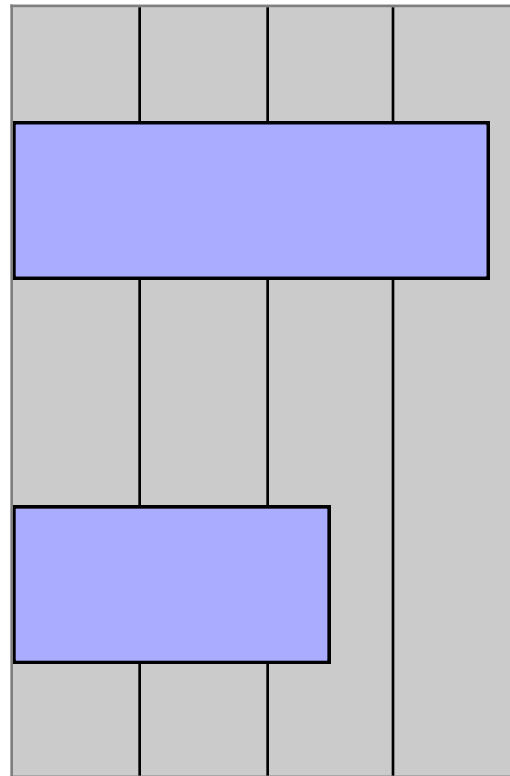
Reli-a-Grip™ clamp - enhances Reli-a-Flex™ performance



Reli-a-Grip™



Conventional clamp



Holding Torque

- Reli-a-Grip™
 - 50% more clamping force than conventional clamps

Patented:

- UK No. 2383112

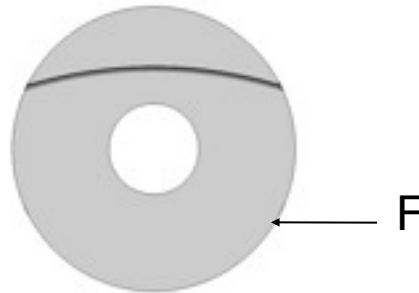
- Conventional clamp
 - In many cases limits the coupling performance



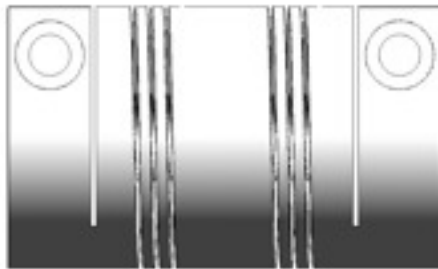
Reli-a-Flex™ - Radial not spiral slits - higher torsional stiffness



Reli-a-Flex™



- Radial slit
 - Torsional forces are applied parallel to the beam in the stiffest plane.



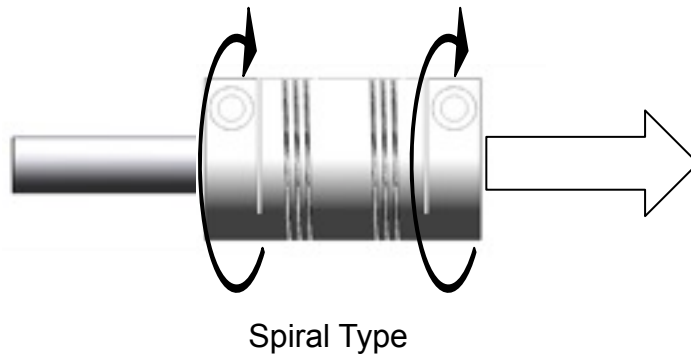
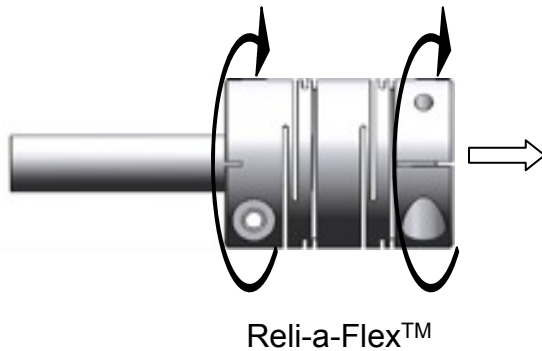
Spiral type



- Spiral slit
 - Torsional forces are applied at an angle causing the beam to twist

Reli-a-Flex™ - Radial not spiral slits

– minimises axial bearing loads



- Radial slit
 - Torsional forces cause very minimal axial movement
- Spiral slit
 - Torsional forces cause wind-up in the slit and axial movement



Reli-a-Flex™ - Radial not spiral slits

– lower radial stiffness

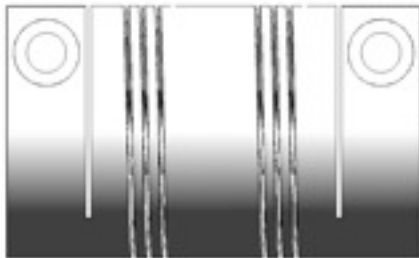


Reli-a-Flex™



- Radial slit

- Radial forces due to shaft offset are in the lower stiffness direction



Spiral Type

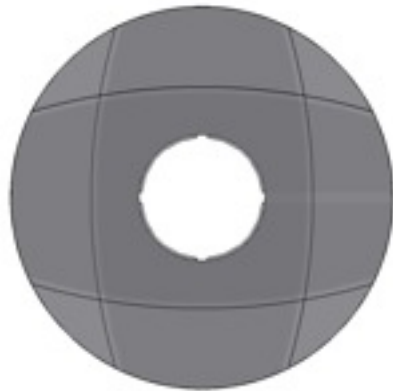


- Spiral slit

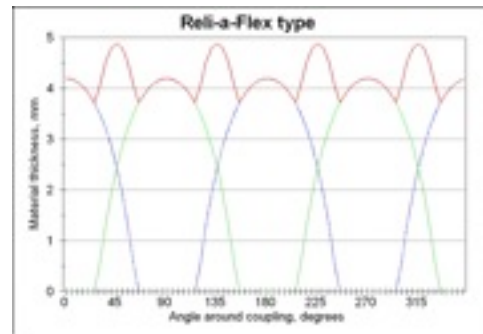
- Radial forces due to shaft offset are applied at an angle causing the beam to twist



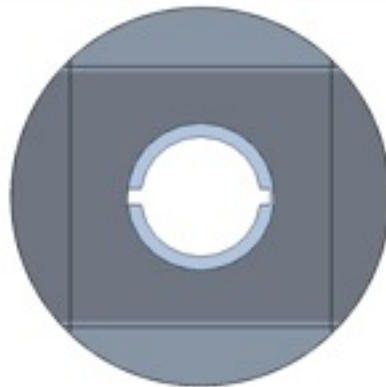
Reli-a-Flex™ - Concave slit shape



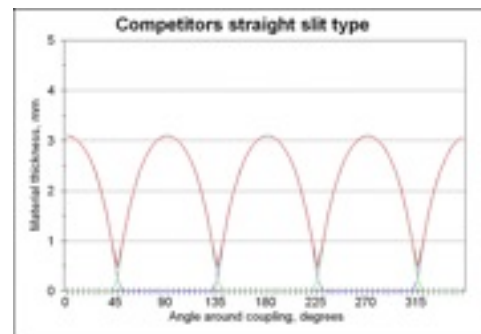
Reli-a-Flex™



- Concave base slit
 - Changes in torsional stiffness are minimised as the forces rotate around the coupling



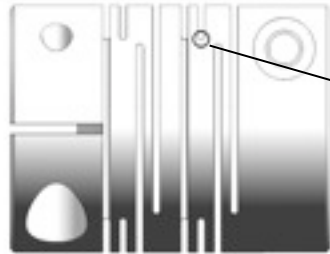
Japanese slit



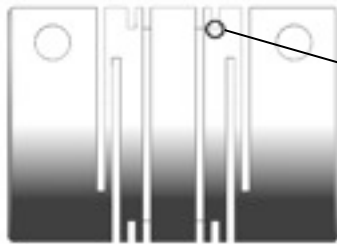
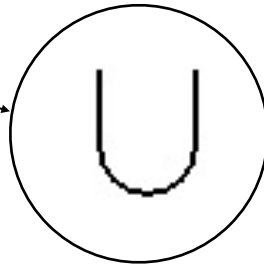
- Straight base slit
 - Changes in torsional stiffness occur at the corners due to reduced material overlap



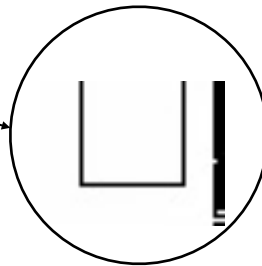
Reli-a-Flex™ - Full radius minimises stress concentrations



Reli-a-Flex™



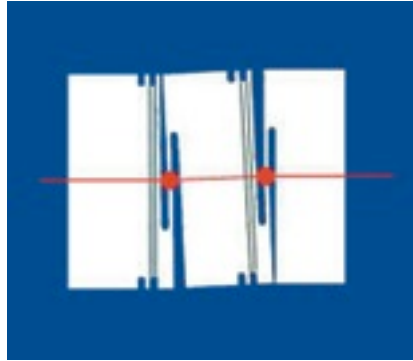
American slit



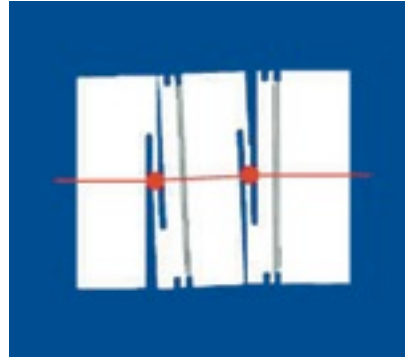
- Full radius slit base
 - Stress concentrations are minimised leading to longer life
- Square section slit base
 - High stress concentrations in the corner leading to lower life



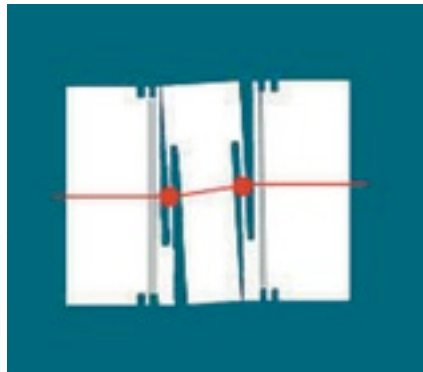
Reli-a-Flex™ - Slit pattern



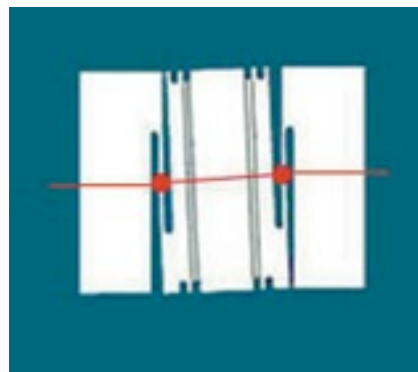
Reli-a-Flex™



Reli-a-Flex™



American slit



American slit

- Parallel slit pattern
 - Minimises stress variations by maintaining a constant pivot length
- Mirror image slit pattern
 - Pivot length constantly changing causing stress variations and less uniform rotation



Reli-a-Flex™ - Excellent transmission of motion



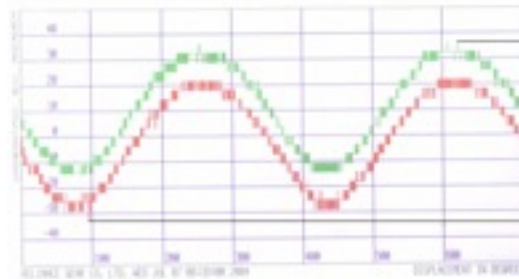
Reli-a-Flex™



14 arc seconds



Japanese slit



69 arc seconds



American slit



35 arc seconds



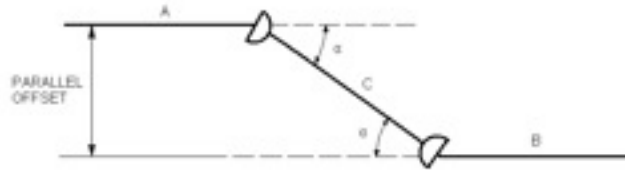
Note

1. The comparative information presented was obtained by evaluating each coupling under identical test conditions, some of the information presented for Japanese and American slit coupling is not available or differs from their printed catalogue.
2. This information is Reliance Gear Company Limited confidential and must be used for internal training purposes only.

Reli-a-Flex™ Extended centre block



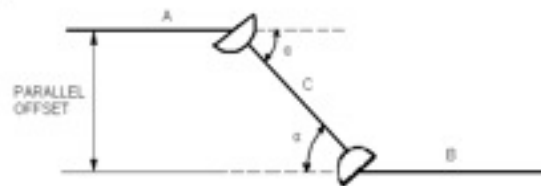
Reli-a-Flex™



- Long centre block
 - Reduces velocity error and minimises stresses



Japanese slit



- Short centre block
 - Increases velocity error and stresses

Reli-a-Flex™ provides long life



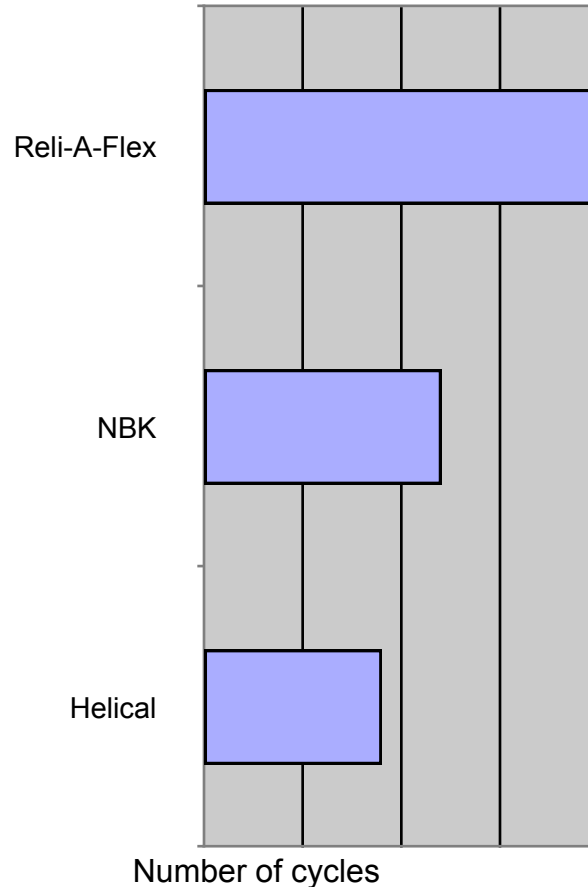
Reli-a-Flex™



Japanese slit



American slit



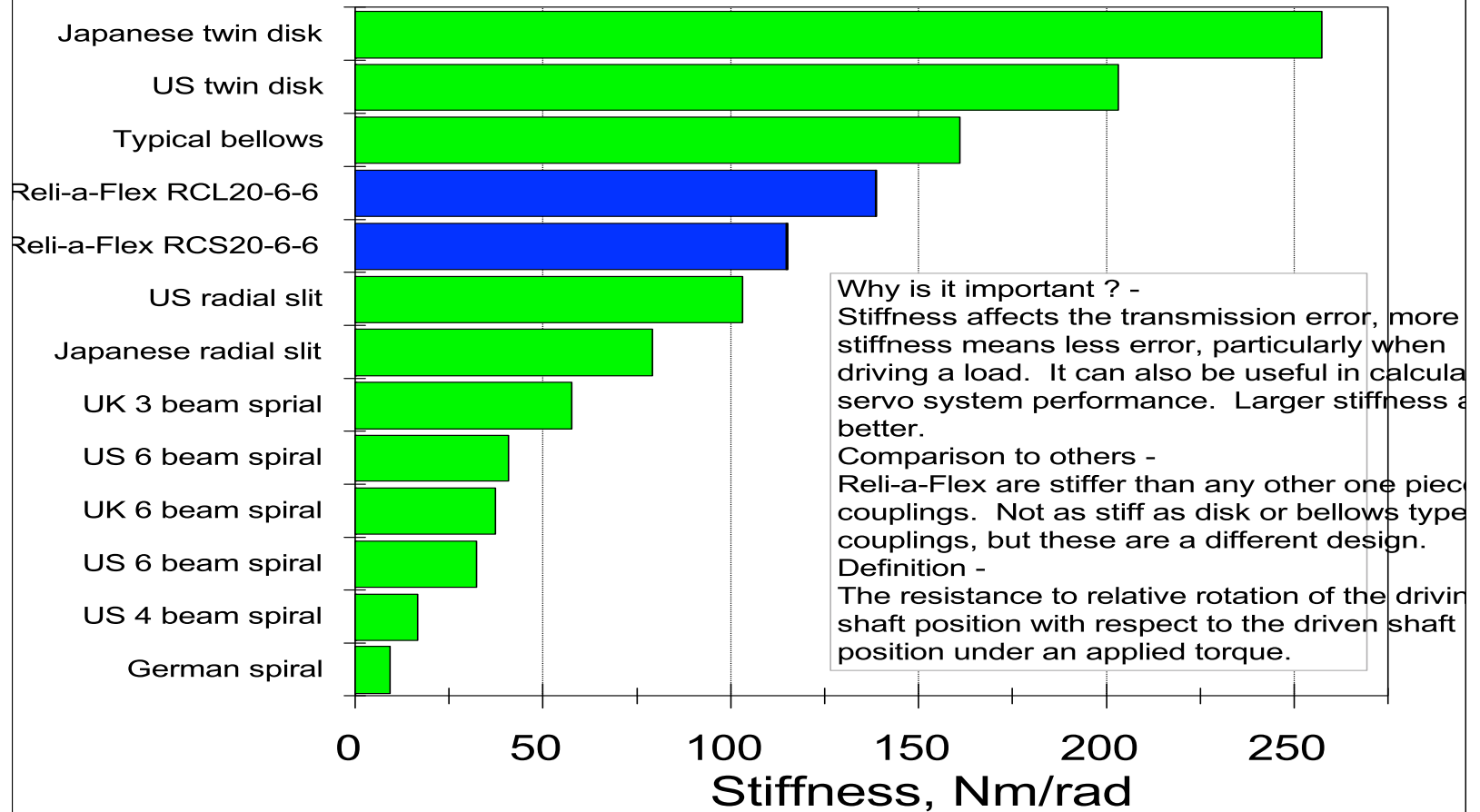
- Test conditions
 - Shafts in line
 - Torque 2.5Nm
 - Speed 2000rpm

Note

1. The comparative information presented was obtained by evaluating each coupling under identical test conditions, some of the information presented for Japanese and American slit coupling is not available or differs from their printed catalogue.
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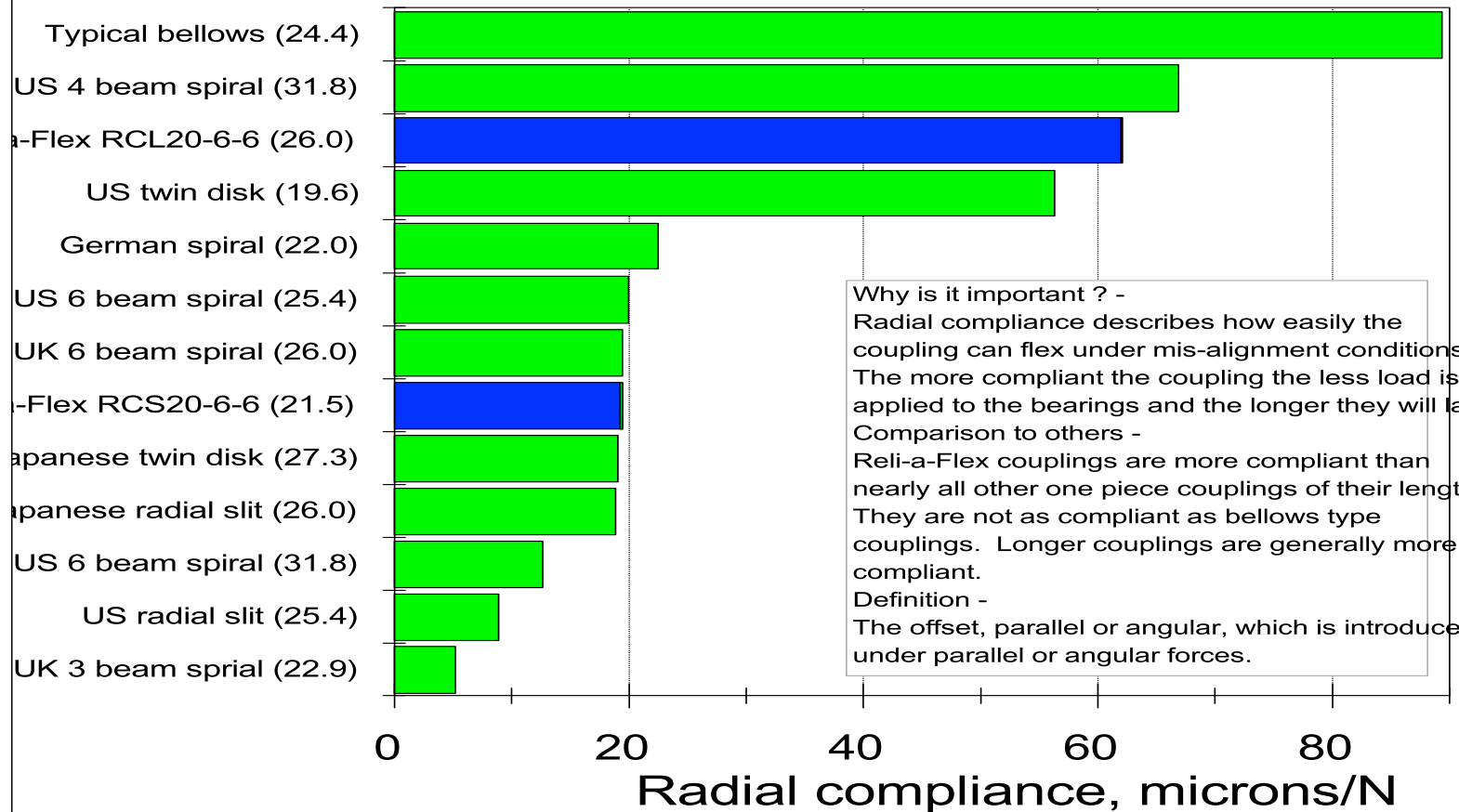
Torsional stiffness

Size 20 comparative tests



Radial compliance

Size 20 comparative tests (length mm)

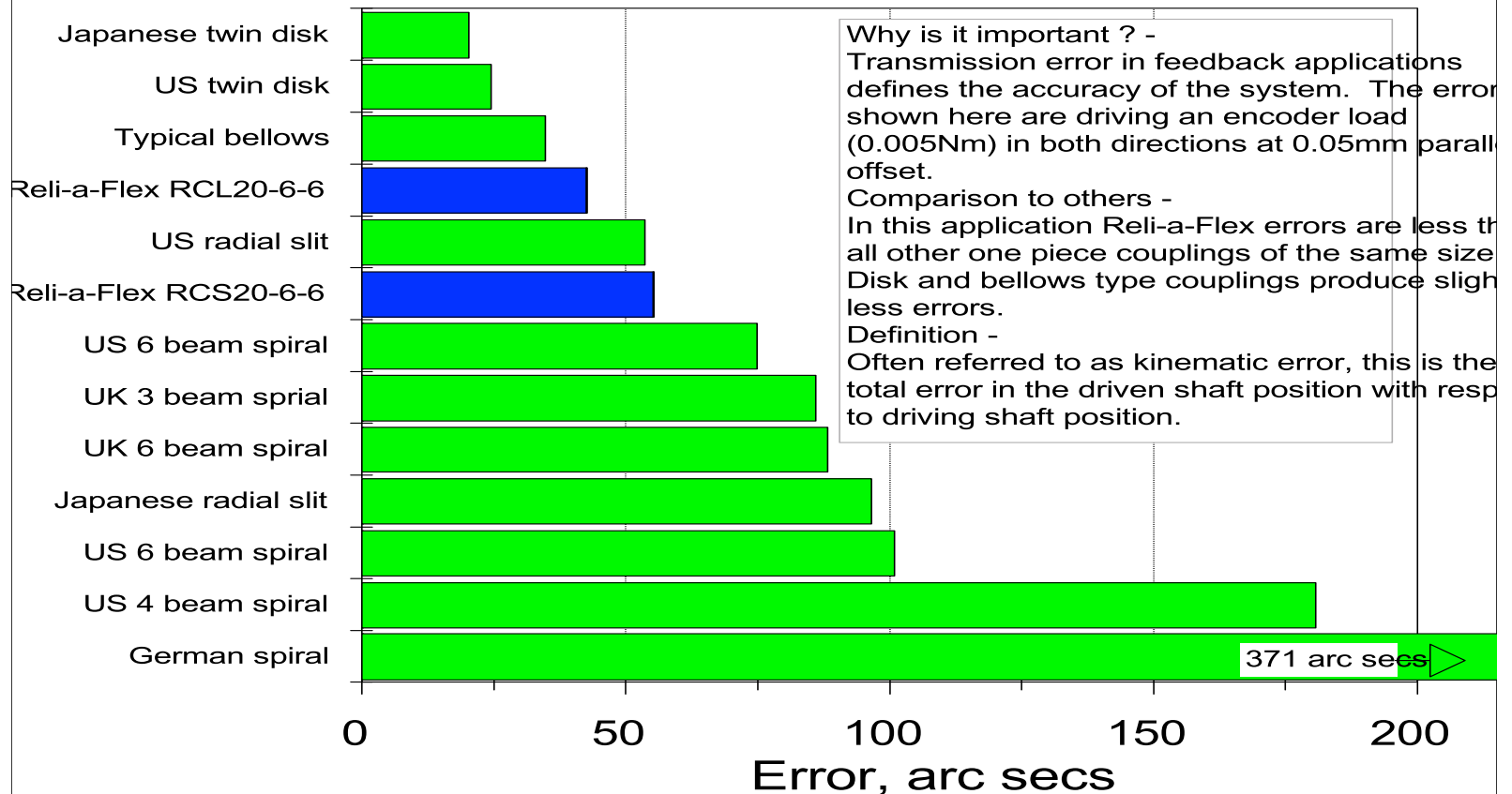


Why is it important ? -
 Radial compliance describes how easily the coupling can flex under mis-alignment conditions. The more compliant the coupling the less load is applied to the bearings and the longer they will last.
 Comparison to others -
 Reli-a-Flex couplings are more compliant than nearly all other one piece couplings of their length. They are not as compliant as bellows type couplings. Longer couplings are generally more compliant.
 Definition -
 The offset, parallel or angular, which is introduced under parallel or angular forces.



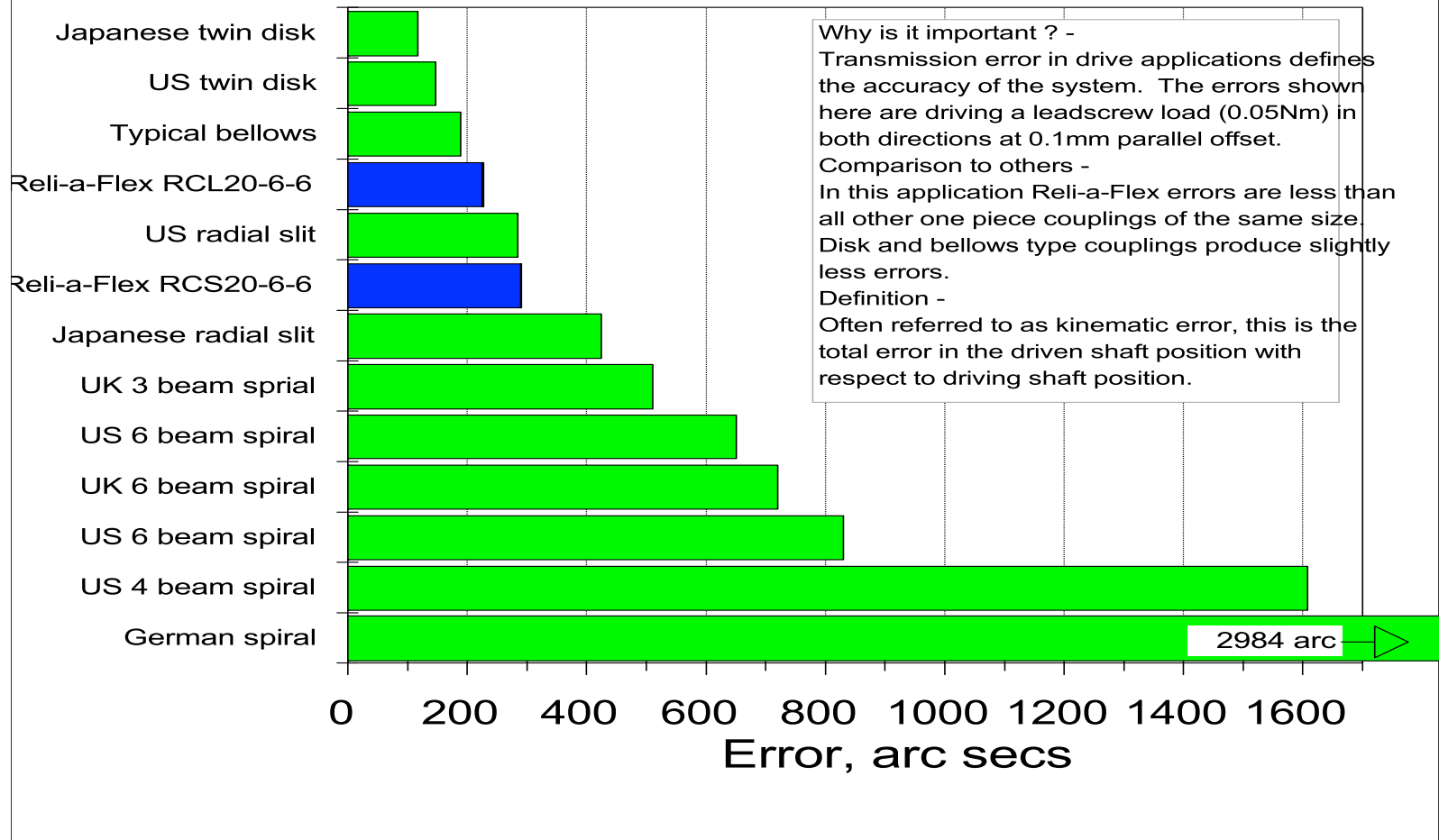
Transmission error, encoder feedback

Size 20 comparative tests



Transmission error, leadscrew drive

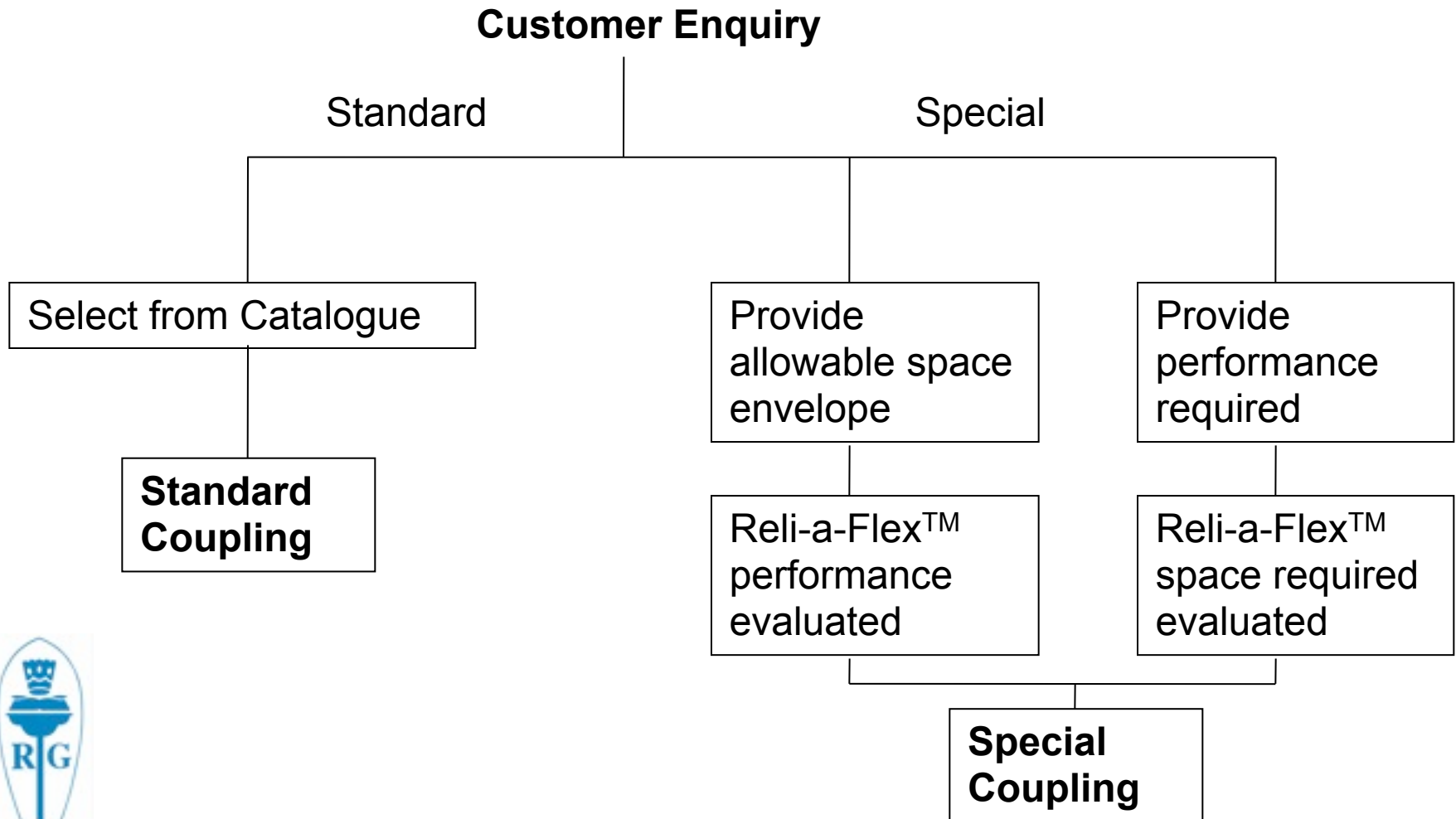
Size 20 comparative tests



Reli-a-Flex™ Range



Reli-a-Flex™ - supply routes



Reli-a-Flex™ – standard applications

- Medical drive systems
- Dispensing systems
- Camera focusing mechanisms
- X-Y table drive systems
- Semi-conductor machines
- Small CNC machines
- Robotics
- Laboratory automation
- Scanning and printing machines



Reli-a-Flex™ – typical special designs

- Nano positioning system
- Kinematic flexible mount
- Mobile phone mast microwave antenna



