

# How To Choose the Most Cost Effective Alignment Dowel

by Christie L. Jones, Market Development Manager  
SPIROL International Corporation, Danielson, CT, U.S.A.

**There are many ways to align components — the challenge for Design Engineers is choosing the best solution at the lowest cost.**

The most common, and often most expensive, Alignment Dowels are manufactured per ISO 8734. These precision ground “parallel” pins provide excellent positional tolerance at a cost. Ground Dowels require extremely tight hole tolerances. In addition, this solution is typically through hardened for strength or case hardened for wear resistance. If the pin’s sole purpose is for alignment, the heat treating process adds cost without any functional benefit.

SPIROL’s GD100 Ground Hollow Dowel is designed to be a direct replacement for Solid Ground Dowels in alignment applications. This lightweight solution will provide the same positional accuracy as Solid Ground Dowels at a fraction of the cost. Like their solid counterparts, GD100 Hollow Dowels are precision ground and require the same hole tolerances for proper installation and retention. The GD100 is approximately 50% lighter than a Solid Dowel; an important consideration for cost conscious Design Engineers seeking weight reduction without sacrificing performance. The lower weight will also translate into significant savings in freight charges.

Although Spring Alignment Dowels, Dowel Bushings, and Coiled Spring Pins are not precision ground, they are still capable of accurately projecting hole position for the purpose of alignment. Each of these options is designed to be larger than the hole in which it is retained. The mechanism of retention is compression rather than interference so hole tolerances can be relaxed and secondary reaming operations can be eliminated to reduce manufacturing costs. The flexibility of these parts also provides much lower insertion force than is required for Ground Solid or Ground Hollow Dowels. The spring characteristics of these parts absorb wide hole tolerances, reduce manufacturing costs, and dramatically reduce component cost when compared to Solid Dowels.

Spring Alignment Dowels and Coiled Pins are often used to accurately position one component to another. Spring Dowels are generally recommended for applications requiring a “dowel” with a length to diameter ratio of 1.5:1 to 4:1. Coiled Pins are generally recommended in applications with greater length to diameter ratios between 4:1 to 10:1. In applications requiring bolts for axial retention, further savings can be achieved by passing the bolt through the inside diameter of a Dowel Bushing. This eliminates the cost associated with drilling a separate hole for the bolt. Dowel Bushings are also hardened to protect the bolt from shear loads, and isolate the forces on the bolt to tension loading to ensure joint integrity.



Ground Hollow Dowels locate an automotive transmission case to the back of the engine.

To select the most cost-effective alignment component Design Engineers must focus on required positional tolerances, cost of secondary operations (reaming/honing holes), overall assembly weight, associated freight charges, and the Dowel or Pin price. Given the variety of alignment components available, Engineers should partner with industry experts to ensure their assembly is equipped with the most cost-effective components providing the performance they demand over the life of the product.

## Why use Solid Dowels?



**Hollow Alignment Dowels simplify assembly, reduce weight and lower cost. Hollow Dowels are 50% lighter and 30% less expensive than Solid Dowels.**

### Hollow Dowels can:

- Maintain precision alignment
- Ease insertion
- Absorb hole tolerance and prevent interlocking
- Protect bolts from shear loads



**Innovative fastening solutions.  
Lower assembly costs.**



Please refer to [www.SPIROL.com](http://www.SPIROL.com) for current specifications and standard product offerings.

**SPIROL** Application Engineers will review your application needs and work with you to recommend the optimum solution. One way to start the process is to visit our **Optimal Application Engineering** portal at **SPIROL.com**.

© 2017 SPIROL International Corporation

No part of this publication may be reproduced or transmitted in any form or by any means, electronically or mechanically, except as permitted by law, without written permission from SPIROL International Corporation.

## Technical Centers

### Americas

**SPIROL International Corporation**  
30 Rock Avenue  
Danielson, Connecticut 06239 U.S.A.  
Tel. +1 860 774 8571  
Fax. +1 860 774 2048

**SPIROL Shim Division**  
321 Remington Road  
Stow, Ohio 44224 U.S.A.  
Tel. +1 330 920 3655  
Fax. +1 330 920 3659

**SPIROL Canada**  
3103 St. Etienne Boulevard  
Windsor, Ontario N8W 5B1 Canada  
Tel. +1 519 974 3334  
Fax. +1 519 974 6550

**SPIROL Mexico**  
Carretera a Laredo KM 16.5 Interior E  
Col. Moisés Saenz  
Apodaca, N.L. 66613 Mexico  
Tel. +52 81 8385 4390  
Fax. +52 81 8385 4391

**SPIROL Brazil**  
Rua Mafalda Barnabé Soliane, 134  
Comercial Vitória Martini, Distrito Industrial  
CEP 13347-610, Indaiatuba, SP, Brazil  
Tel. +55 19 3936 2701  
Fax. +55 19 3936 7121

### Europe

**SPIROL France**  
Cité de l'Automobile ZAC Croix Blandin  
18 Rue Léna Bernstein  
51100 Reims, France  
Tel. +33 3 26 36 31 42  
Fax. +33 3 26 09 19 76

**SPIROL United Kingdom**  
17 Princewood Road  
Corby, Northants  
NN17 4ET United Kingdom  
Tel. +44 1536 444800  
Fax. +44 1536 203415

**SPIROL Germany**  
Ottostr. 4  
80333 Munich, Germany  
Tel. +49 89 4 111 905 71  
Fax. +49 89 4 111 905 72

**SPIROL Spain**  
08940 Cornellà de Llobregat  
Barcelona, Spain  
Tel. +34 93 193 05 32  
Fax. +34 93 193 25 43

**SPIROL Czech Republic**  
Sokola Tümy 743/16  
Ostrava-Mariánské Hory 70900  
Czech Republic  
Tel/Fax. +420 417 537 979

**SPIROL Poland**  
ul. M. Skłodowskiej-Curie 7E / 2  
56-400, Oleśnica, Poland  
Tel. +48 71 399 44 55

### Asia Pacific

**SPIROL Asia Headquarters**  
1st Floor, Building 22, Plot D9, District D  
No. 122 HeDan Road  
Wai Gao Qiao Free Trade Zone  
Shanghai, China 200131  
Tel. +86 21 5046 1451  
Fax. +86 21 5046 1540

**SPIROL Korea**  
160-5 Seokchon-Dong  
Songpa-gu, Seoul, 138-844, Korea  
Tel. +86 (0) 21 5046-1451  
Fax. +86 (0) 21 5046-1540

e-mail: [info@spirol.com](mailto:info@spirol.com)

**SPIROL.com**