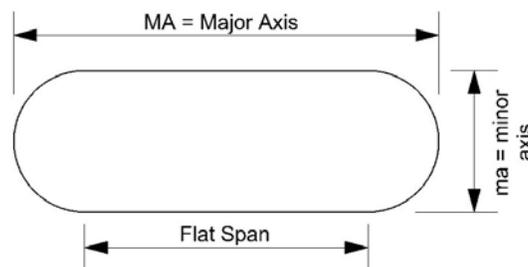


Single-Wall Flat Oval Fittings

Flat oval fittings have many of the same characteristics and benefits of round fittings. While aspect ratio (the ratio of width versus height) plays a role in making both flat oval and rectangular duct costlier than round --- in both product cost and operation cost --- the features of flat oval duct make it a much better option when space constraints prevent the use of round duct. First, the rounded corners do not produce the turbulence inherent in rectangular duct. This gives you the ability to carry more volume and higher velocities without the generated noise and dynamic losses of rectangular duct. Where rectangular duct is essentially four flat surfaces, flat oval duct has flat surfaces on only two sides. That “flat span” (major axis minus minor axis) is also less than the corresponding surface on a rectangular duct. This, in turn, reduces the generation of low frequency noise (oil-canning) and can reduce the amount of reinforcement needed to meet duct deflection and structural requirements. For this and other reasons, the ASHRAE Advanced Energy Design Guides all recommend that flat oval ducts --- not rectangular ducts --- be used when space limitations prevent the use of round ducts.

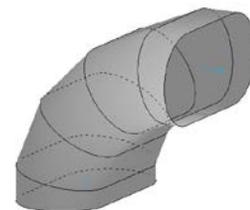
There are some terms used with flat oval duct that will allow you to communicate more effectively between design, fabrication and the field installation. They are important not only in getting the duct built, but also in designing the performance of a flat oval duct system. We’ve already used the terms “aspect ratio” and “flat span”. Other terms that require definition are “major axis” and “minor axis”. Minor axis is often the reason why you can’t use round duct --- your available height. It plays a critical role in fabrication as well. Many spiral duct manufacturers are limited in the tooling they have for making different minor axis. Unless you are using flat oval duct strictly for aesthetic purposes, best practice is to keep the aspect ratio as low as possible, use all of your available height, and transition from flat oval to round as soon as possible. Minor axis of your duct should be available height minus required insulation and reinforcing. When designing the duct system, remember that round ducts probably do not require the external reinforcement that flat oval ducts do. So, your maximum round size that fits in a space could be larger than the minor axis you use.



The other critical terms for flat oval fittings are “hard bend” and “easy bend”. They are probably best understood by the illustrations here. Hard bend fittings rotate on the same plane as the major axis. Easy bend fittings rotate on the plane of the minor axis. These terms have obvious importance in describing to the manufacturer what should be built. They also have significant differences in dynamic performance, weight, surface area, reinforcement and cost.



Hard Bend



Easy Bend

Standard fabrication of flat oval fittings from Spiral Pipe of Texas is in accordance with Table 3-15 “Flat Oval Duct Gage Positive Pressure To 10 in. wg” from the SMACNA HVAC Duct Construction Standards – Metal and Flexible (2005). For information on the performance of our fittings, please consult the ASHRAE Duct Fitting Database. Critical characteristics of our flat oval fittings are within industry standards and agree with those published by SPIDA (The Spiral Duct Manufacturers Association).