The Importance of Spiders

CAUTION: FAILURE TO INSTALL SPIDERS CAN RESULT IN POOR VESSEL PERFORMANCE AND INTERNAL FIRE OR EXPLOSION FROM STATIC DISCHARGE

Spider plates (spiders) are an important part of a filter separator vessel. Spiders are usually made of aluminum or stainless steel, and may be rigid or open-mesh design. Spiders are fitted over the ends of various types of filter cartridges within the filter vessel.

There are five purposes for spiders in vessels:

1. To keep the cartridges separated in order to equalize flow around the cartridges, and to provide paths for the coalesced water drops to fall to the sump

2. To give support to the "free" ends of the cartridges (the ends not rigid against the deckplate)

3. To prevent microbial growth

4. To meet EI 1581 5th Edition requirements

5. To prevent static discharge and internal fires

Keeping the coalescers (first stage cartridges) from touching each other enhances the coalescing process by giving room between the coalescers for the water to fully form into drops 1/8 to ¼ inch in diameter, and then having room to fall by gravity to the sump at the bottom of the vessel.

It is very important to support the free ends of cartridges, particularly the heavy coalescers in horizontal vessels. Without a spider supporting the free ends, and without the spider being rigidly clamped or clipped to the vessel interior, the free ends can be exposed to heavy vibration
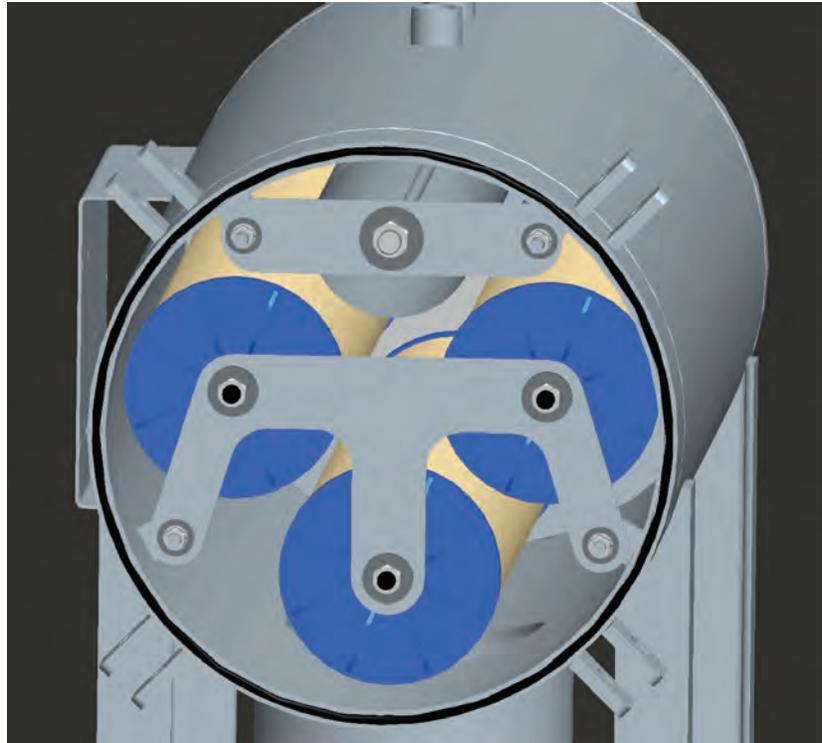

Figure 1.   Two spiders in horizontal filter/separator bonded by clips to vessel.

which could eventually loosen the mounting ends leading to bypass, or even rupture the mounting.

Another reason to keep the coalescer socks from touching each other is to reduce the microbial growth area. Have you ever seen a light or dark grayish or blackish line running vertically down a coalescer? This is microbial growth.

EI 1581 5th Edition Specification requires the use of spiders for cartridges longer than 18 inches (3.2.2.13) as well as certain minimum spacings between coalescers, separators (second stage cartridges), and between coalescer and separator within qualified vessels (3.2.2.15). To maintain such

spacing a spider is required.

Spiders in the various vessels should not be allowed to become "unbonded charge collectors." A solid electrical path from the spider to the vessel shell is essential. This can be accomplished through the tie rods that make solid contact with the spider, or by contact with a metal clip attached to the side of the vessel. (Some filter/separator vessels have two spiders as shown in Fig. 1).

The spider for the separators is electrically bonded to the tie rods that are bonded to the vessel. However, the other spider on the screw-base coalescers might not be bonded to anything (it thus becomes an "unbonded charge collector" which could lead to fires in the vessel).

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Insure that these spiders are bonded electrically to the vessel by attaching to a metal clip, or by a braided stainless steel wire to the separator spider (see Fig. 2).

When converting a pre-filter (micronic) vessel from open-ended cartridges with tie rods to screw-base cartridges, ensure the spider is somehow bonded to the vessel either by support clips on the vessel interior or by the braided stainless steel wire to the baffle plate (see Fig. 3).

A prefilter vessel with no internal baffle plate is a problem. The purpose of the baffle plate or angle iron is to divert flow to the top of the vessel so the full flow does not all work against the nearest cartridges. Without the baffle plate, the nearest cartridges to the inlet can be torn apart. This vessel had been converted to screw-base filter cartridges, and had an unbonded spider at the top. There was visual and audio evidence of internal electrical discharge. Spiders, properly bonded, are important components of filter vessels!
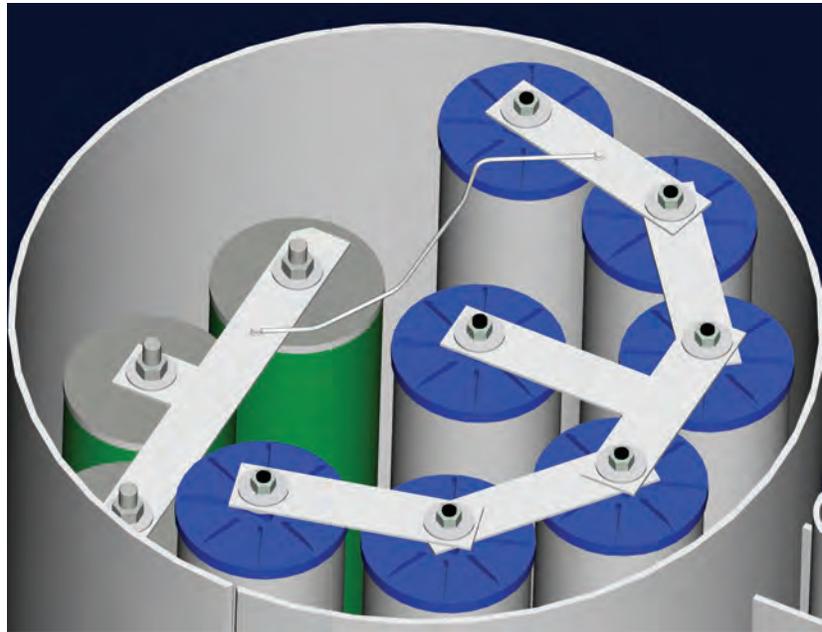
Figure 2.   Two spiders in vertical filter/separator bonded together with braided stainless steel wire, bonded to vessel via separator tie-rods.

Figure 3.   Spider on pre-filter bonded to baffle with braided stainless steel wire.