

Rotors: Wiped Film or Thin Film (Rigid)?

There is a lot of discussion concerning which is the best rotor type for an agitated film evaporator. This article will discuss the differences between wiped film and rigid rotors as well as discuss the various types of wiped film rotors.

What is the best type to use? In most cases, the answer is clearly...it doesn't make any difference! From a heat transfer perspective, they all perform the same. I had the experience of running a pilot test for Glycol recovery. I processed the same material, at the same conditions with both a rigid rotor and a wiped film rotor and the heat transfer coefficient was identical! However, there are times when one rotor type is preferable over the others. I will give some examples below.



Rigid (Thin Film) Rotor

When do I specify a Wiped Film Rotor?

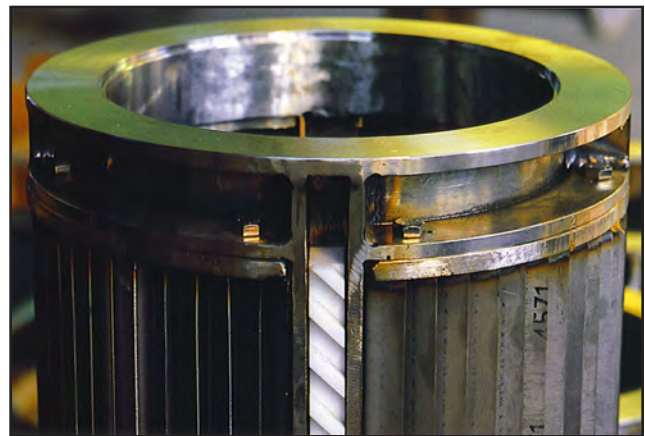
- High distillate ratios (>90%)
- Highly fouling materials
- Concentrates that stick to a bottom bearing support (Wiped Film Rotors normally are an overhung design with no bottom bearing)

When do I specify a Thin Film Rotor?

- Viscosities > 20,000 centipoise
- High shear rate requirements (Rotors can operate in the 8-16 meter/second range)
- Very low residual requirements (e.g. <10 ppm)

Are all Wiped Film Rotors the Same? No, there are several varieties. I will describe them and their niche applications below.

- Smith Rotor: Good for clean fluids up to 20,000 cps. Weakness is dirty or sticky products that can get behind the rotor element and cause problems.



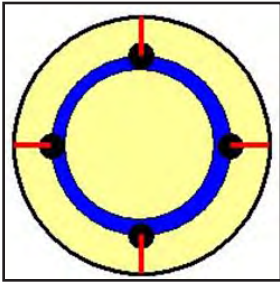
Smith Rotor

- Scraper Block Rotor: A second generation Smith Rotor that accommodates dirty, sticky materials.



Scraper Block Rotor

- Roller Wiper System: A cost effective solution for clean fluids up to 2,000 Centipoise.



Hinged Blade

- Hinged Wiper Blade: A good robust design. The only weakness is the hinges that can stick with product.



Roller Wiper System

Another consideration may be **maintenance**: For non-abrasive applications, neither rotor will require much maintenance. The wiped film evaporator will have a smaller drive and the

rotor speed is approximately 1/3 of the rigid rotor reducing bearing and seal maintenance. Also, there is no lower bearing on most wiped film designs, also lowering the maintenance costs. In general though, the wear on the wiped film rotor will be greater than for a rigid rotor. Countering this is the ease of repairs. To replace worn wiper elements is simple and no special know-how is required. To repair a rigid rotor requires special know-how and the availability of a shop with a lathe and balancing machine. If selecting a rotor design comes down to maintenance, then what is important for the customer is whether he has the capability to do a complicated repair in-house, or is willing to send it out versus an easier, though more frequent, in-house repair.

Summary: From a heat transfer perspective, all agitated film evaporator rotors perform the same. Depending on the product viscosity, distillate ratio, fouling tendencies and residual required. If you have questions, please call me. I will be happy to discuss the specifics of your application with you.

Bob Schavey, Business Development Manager



We're Growing...

Due to the expansion of VTA GmbH, we moved to our new office building located next to our assembly and manufacturing halls in Niederwinkling, Germany (about 15 km away from Deggendorf). The location of our laboratory and toll distillation facilities will, for now, remain at our facility in Deggendorf. You will now find us at the following address:

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