Current Characteristics for a 3ph Pump Application

thread237-262245

01jonny01 (Electrical) 5 Jan 10 19:18

Hello I have just installed a new 3ph induction pump which is powered by a softstart. I have been montoring the current the motor has been taking. I have noticed that when the pump, pumps water against a blocked end the current the motor takes reduces. And when the pump, pumps water against a open end the current significantly increases.

I know when asynchronous speed of a 3 ph induction motor starts to reach the synchronous speed of the stator rotating magnetic field, current decreases and the torque increases (before both decreasing to zero).

My first question....

What I'm struggling to underst is, why this is happening. I initially thought that if the pump, pumps against a dead end the current will increase not decrease?? can some1 describe the reason to me in terms of flux lines speed and slip as a result of the water being pumped.

I have concluded that when flow in the pipe increases so does current.

Second question....

Also the engineer on site told me to slowly crank open the valve downstream of the pump,while openin a tap to bleed the air trapped in the pipe. This allows the pipe to fill with water while the air is being bled, he said this will reduce the current the motor takes, so that we dont go beyond the motor rated current. He said something about the air being compressible. Does anyone know of this??

I thank you in advance for any answers given.

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dpc (Electrical) 5 Jan 10 19:28

Maybe read up on centrifugal pump characteristics a little:

http://www.gouldspumps.com/cat_pf_0001.html

Yes, air is compressible. Water, not so much.

"Theory is when you know all and nothing works. Practice is when all works and nobody knows why. In this case we have put together theory and practice: nothing works... and nobody knows why! (Albert Einstein)

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rbulsara (Electrical) 5 Jan 10 19:34

What you are observing is true for centrifugal pumps, they only generate head when there is a flow, otherwise the fluid will just churn in the casing without (or minimal) mechanical impediment to the impeller. It is 'unlike' positive displacement pumps.

You need both the head (pressure H) and flow (Q)for real power (HP) to be consumed. HP=Q*H

This has been discussed a few times in this forum. You may want to do a search on the topic or check out the Pumps forum.

As for the second question, I am not a mechanical engineer but the air needs to be removed so that no air bubbles are trapped obstructing the flow. I am not too sure I would agree with your engineer's assessment of the relationship between the air bubbles and the power. Centrifugal pumps generally do not care what happens downstream of the pumps, if the flow is obstructed for any reason, it will simply consume less power.

Rafiq Bulsara
http://www.srengineersct.com/

01jonny01 (Electrical) 5 Jan 10 19:44

Thanks for yours answers so far guys. The mechanical engineer told me to start up the pumps like this.

1. Turn on pump with downstream shut off valve closed

2. Open the air bleeding points

3. slowly crank open the shut off valve, while monitoring motor current

4. when a steady flow of water is flowing out of the bleed point, this means the pipe is full

5. the shut off valve can now be opened fully

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rbulsara (Electrical) 5 Jan 10 20:05

That sounds like a good procedure.

Rafiq Bulsara
http://www.srengineersct.com/

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edison123 (Electrical) 5 Jan 10 21:08

But if you're already using a soft starter to control the motor starting current, then why would you go through steps 1 to 5 ?

Muthu
http://www.edison.co.in/

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electricpete (Electrical) 5 Jan 10 22:08

This may (?) be helpful:
FAQ237-1543: How does hp change with flow for a "centrifugal pump"

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jraef (Electrical) 5 Jan 10 22:59

Think of it this way. "Work" in a centrifugal pump system is flow through the pump*. When the valve is closed, what work is the pump performing? No flow, no work. No work, less slip in the motor; less slip, less current. It has nothing to do with flux lines etc.

That procedure by the way has little to do with starting current. It has more to do with other mechanical issues, i.e. water hammer. Air in the line can help absorb the shock wave that is "water hammer", but cannot be left trapped in the system without decreasing the flow capacity.

* Before we go off on the usual tangential argument, I recognize that not ALL centrifugal pumps work this way, I am simplifying because he has already observed it, which mean HIS must...

"If I had eight hours to chop down a tree, I'd spend six sharpening my axe." -- Abraham Lincoln
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amptramp (Electrical) 6 Jan 10 14:34

> **Quote (jraef):**
> It has nothing to do with flux lines etc.

jraef: I may be misinterpreting your comments, so pardon me if I have. Although simplistically speaking your general comment "No flow, no work. No work, less slip in the motor; less slip, less current." is accurate, to say "It has nothing to do with flux lines" belies how an induction motor actually works. The real current flow in the stator (motor) is due to the interaction of the stator Back EMF and the flux generated by the current flowing in the rotor. The real current flow in the motor has everything to do with flux lines.

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jraef (Electrical) 6 Jan 10 19:20

LOL, yes you're right. I was thinking he wanted to know if there was something special about it with reference to it being a pump, whereas it only has to do with load; any kind of load.

"If I had eight hours to chop down a tree, I'd spend six sharpening my axe." -- Abraham Lincoln
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amptramp (Electrical) 6 Jan 10 20:14

jraef:

I wasn't sure either so I thought I would clarify the point - I was just sharpening the axe! 

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jonr12 (Mechanical) 7 Jan 10 10:35

What I have leaned recently is that restricting a centrifugal pump will reduce the amp draw almost exactly as much as reducing the RPM. There is a good discussion on this subject at...

http://www.eng-tips.com/viewthread.cfm?qid=260203&page=1

I had another long discussion with my AB salesman yesterday on this subject. Again he wasn't listening. He keep going on about how the new faster switching VFD's create an almost perfect sinusoidal wave, which doesn't waste energy like the older systems, which have a sub-standard wave form and lots of harmonics.

I told him yes, the sub-standard wave form from a VFD was a waste of energy but, that is not the waste I am talking about. I showed him some pump curves and told him that regardless of the wave form, horse power or energy per gallon increases as the pumps RPM is reduced. Pump curves didn't make any sense to him. He kept trying to tell me that my 10 HP pump could be slowed down until it was only pulling a 1 HP load. When I explained this wasn't possible because there is a certain minimum speed needed to maintain the pressure or head required, and showed him a minimum speed curve, he said I must be doing something wrong and he didn't agree with me.

He basically said the same thing I have heard from several other VFD people. He said that I was entitled to my own opinion but, that I was wrong. And again I heard the same old line that "VFD's save energy and Valves waste energy". I laughed at him and made him mad. I told him that his way of thinking is what caused this myth. He got even more angry when I mentioned that his "myth-understanding" was causing people to "myth-apply" VFD's. And that "myth-applying" VFD's in this way is wasting tremendous amounts of energy, and dumping millions of tons of green house gases into the atmosphere.

I shouldn't have gone off on him but, I was trying to make a point. Just like every VFD salesman I have had this conversation with, he got mad instead of getting smarter.

Sorry to have gotten off track a little bit, so back to the question.

"I have noticed that when the pump, pumps water against a blocked end the current the motor takes reduces. And when the pump, pumps water against a open end the current significantly increases." 01johnny01

The is exactly how most centrifugal pumps work, which is just opposite of how most people think.

"I initially thought that if the pump, pumps against a dead end the current will increase not decrease??" 01johnny01

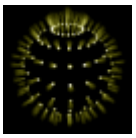
I use to think this as well. But it is just another myth-conception that most people, and I guess nearly all VFD salesmen believe. I guess once we have something in our heads, it is hard to change, even with pump curves staring you in the face that prove otherwise. I will no longer take the advice of a salesman, technician, or engineer unless they understand this one, very important point.

ScottyUK (Electrical) 7 Jan 10 11:37

jonr12,

Do you have a lisp? If not, please try to spell 'mis-understanding' and 'mis-apply' correctly. This is a multi-national forum and the deliberate mis-spelling of words for your own amusement doesn't help users who have

English as a second language. Thanks.



If we learn from our mistakes I'm getting a great education!

01jonny01 (Electrical) 7 Jan 10 17:56

Thanks for all your replys guys, still a bit confused about the relationship between air in the pipe and the current, as the engineer mentioned. Any one have any more thoughts about that?

Compositepro (Chemical) 7 Jan 10 18:26

Air in the pipe is basically an empty pipe which provides no resistance to flow out of the pump. Therefore the pump will experience its maximum possible load at start-up.

The way to think of a centrifugal pump is that it simply has an impeller that spins and gives momentum to the water. If the pump discharge is closed, the spinning water stays in the impeller and the only energy used is viscous friction with the stationary pump casing. Open the discharge, and the spinning water will move outward to the discharge due to its momentum. This allows slow moving water to enter at the center of the impeller, which must be accelerated to spin with the impeller. This applies a significantly increased load on the impeller.

The shape of the vanes on an impeller are designed for best efficiency at the designed flow rate. Some pumps have straight radial vanes. With this design it is easy to see that back pressure on the discharge of the pump will not produce any forces on the impeller. Only the momentum of water hitting the vanes has an effect.

An axial-flow propeller pump is not a centrifugal pump. It works like a boat propeller and therefore has quite different operating characteristics. They may be used is similar pumping applications but they are uncommon relative to centrifugal pumps

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electricpete (Electrical) 7 Jan 10 21:48

> **Quote (CompositePro):**
> An axial-flow propeller pump is not a centrifugal pump.

CompositePro – Since this is presumably a comment on my FAQ, I will respond:

http://www.pumpworld.com/contents.htm

> **Quote (PumpWorld):**
> **Centrifugal Pumps are classified into three general categories**: Radial Flow, Mixed Flow, **Axial Flow**...
>
> **...Axial Flow - a centrifugal pump** in which the pressure is developed by the propelling or lifting action of the vanes of the impeller on the liquid.

http://www.pumps.org/content_detail.aspx?id=1768

> **Quote (PumpsDotOrg):**
> *[Hydraulic Institute:]* **Centrifugal Pumps** ....Impeller designs -
> Impeller designs are grouped as either radial flow, mixed flow, or **axial flow** depending on their hydraulic geometry

http://www.tpub.com/content/doe/h1018v1/css/h1018v1_99.htm

> **Quote:**
> [Page 4:]*[DOE]*
> **Centrifugal Pump** Classification by Flow
> Radial Flow Pumps...
> [Page 5:].
> Axial Flow Pumps
> Figure 7 – **Axial Flow Centrifugal Pump**

http://www.grainger.com/production/info/centrifugal-pump.htm

> **Quote (Grainger):**
> A **centrifugal pump is classified into one of three** basic categories The three centrifugal pump categories are radial flow, mixed flow, and **axial** flow

http://www.cheresources.com/centrifugalpumps3.shtml

> **Quote:**
> **Centrifugal Pumps**: Basic Concepts of Operation, Maintenance, and Troubleshooting (Part- I)....
>
> Rotating Components
>
> Impeller
> The impeller is the main rotating part that provides the centrifugal acceleration to the fluid. They are often classified in many ways.

Based on major direction of flow in reference to the axis of rotation

Radial flow
Axial flow
Mixed flow

http://www.ohlerengineering.com/impeller_analysis.htm

Quote:
Ohler Engineering is in the unique position, with wide ranging product line and system experience, to deliver fast accurate **centrifugal pump designs** to our clients. We continue to develop our design data base on **axial**, mixed flow and radial impeller designs

http://www.engineeringtoolbox.com/classification-pumps-d_55.html

Quote (EngineeringToolbox):
Centrifugal Pumps (Roto-dynamic pumps)
Centrifugal pumps can further be classified as
•end suction pumps
•in-line pumps
•double suction pumps
•vertical multistage pumps
•horizontal multistage pumps
•submersible pumps
•self-priming pumps
•**axial-flow pumps**
•regenerative pumps

http://www.gouldspumps.com/cpf_0009.html

Quote (GouldsPumps):
Section A -- Centrifugal Pump Fundamentals
A-7 Pump Characteristic Curves
The performance of a centrifugal pump can be shown graphically on a characteristic curve. A typical characteristic curve shows the total dynamic head, brake horsepower, efficiency, and net positive Suction head all plotted over the capacity range of the pump.
Figures 5, 6, & 7 are non-dimensional curves which indicate the general shape of the characteristic curves for the various types of pumps....
Figure 7 – **Axial Flow Pump**

So regardless what your intuition would tell you, the term "centrifugal pump" is commonly used to apply to all three: radial, mixed and axial. What you call it is not particularly important to me... if you have a large vertical pump with only the packing/stuffing box visible above grade (as many in our plant), then it can be a small challenge to tell the difference between radial, mixed, axial. What is important imo is to recognize there are a variety and they act differently.

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Compositepro (Chemical) 8 Jan 10 16:44

Pete, it is amazing how you can become a pump expert in a few hours of Googling. Misnomers are very common and do not contribute to good communication or understanding.

According to your sources centrifugal pumps are also constant horsepower loads and so are lathes and drill presses. Perhaps you should spend more time thinking about the meaning of what you read rather than passing on misconceptions.

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electricpete (Electrical) 8 Jan 10 18:57

I'm not sure what makes you think my pump knowledge is limited to a few hours of googling. What I have done in this thread is to provide proof of the specific point of terminology that you challenged in a form that is verifiable for anyone on the forum based on sources such as: Hydraulic Institute, ITT/Goulds Pump (OEM), and others. And it is not based on applying the physics 101 definition of centrifugal, it is based on standard industry terminology.

As for any other misconceptions you think you have discovered, feel free to bring them in the open so they can be discussed and refuted. Otherwise, I have a hard time taking your comments seriously.

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rbulsara (Electrical) 8 Jan 10 22:30

Even with my limited knowledge of fluid dynamics and with all due respect to electricpete, I have to agree with Compositepro, axial flow machines (pump or fan or compressor) are not centrifugal machines.

There is no centrifugal force involved in axial machines. They do not work on the principle of a centrifuge or centrifugal force. Centrifugal machines by definition have 'radial' flow. A radial flow machine cannot have axial flow as its subcategory.

A more careful google search would throw up books and discussions that explains Centrifugal Pumps "AND" Axial Flow Pumps along with reviews. Just that taking everything that appears on internet for granted is dangerous.

Rafiq Bulsara
http://www.srengineersct.com/

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electricpete (Electrical) 8 Jan 10 23:27

Okie dokie guys.

I posted a FAQ. The FAQ says the terminology centrifugal pump is sometimes used to describe an axial flow pump.

CompositePro tells me I am wrong.

I provided links to prove my point. Hydraulic institute and Gould's pump. These are not slouches in the pump field. And I added that I dont' care what you call it, the important point is there are differences.

CompositePro tells me I am still wrong. Apparently it is not even a gray area, it is so black and white that CompositePro feels justified to escalate to a personal attack.

Okie dokie. One more reference. Pump Handbook by Karassik.
[quote]A centrifugal pump is a rotating machine in which flow and pressure are generated dynamically. The inlet is not walled off from the outlet as is the case with positive displacement pumps, whether they are reciprocating or rotary in configuration. Rather, a centrifugal pump delivers useful energy to the fluid or "pumpage" largely through velocity changes that occur as this fluid flows through the impeller and the associated fixed passageways
of the pump; that is, it is a "rotodynamic" pump. **All impeller pumps are rotodynamic, including those with radial-flow, mixed-flow, and axial-flow impellers: the term "centrifugal pump" tends to encompass all rotodynamic pumps.**[quote]
I guess you can tell me that Karassik has misconceptions, just like I do and just like Hydraulic Institute does and just Gould's pumps does. So be it - believe what you want. Time to move on.

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edison123 (Electrical) 9 Jan 10 7:02

From Fan Engineering Handbook from Howden Buffalo under chapter "centrifugal fans"

"The flow through the centrifugal machines is chiefly radial in the region of energy transfer and is easily distinguished from the flow in the axial flow machines. Axial flow fans are discussed in the next chapter, but many of the principles of energy transfer are applicable to axial flow as well as centrifugal fans".

I think axial flow fans are clearly distinguished from the centrifugal fans though they may share some principles of energy transfer.

Muthu
http://www.edison.co.in/

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electricpete (Electrical) 9 Jan 10 10:53

I said axial flow pumps are commonly called centrifigual pumps. I never said it was universal useage. And I never said anything about the direction of flow or the mechanism of energy transfer or the logic of the term.

Karassik, Goulds, Hydraulic Institute and many others back me up - centrifugal pump is commonly used to include axial flow pumps. And in spite of what some imply, it is not just that he **used** the term that way, he **defined** the terminology that way. [b]All impeller pumps are rotodynamic, including those with radial-flow, mixed-flow, and axial-flow impellers: the term "centrifugal pump" tends to encompass all rotodynamic pumps. [[b]

If anyone here has more credentials to talk about centrifugal pump terminology than Karassik, then please feel free to add your two cents as to why you think I'm wrong. Otherwise, I am not really interested.

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electricpete (Electrical) 9 Jan 10 10:58

Clarification:
"he defined the terminology that way"
should be:
"he **explained** the terminology **useage** that way"

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edison123 (Electrical) 9 Jan 10 11:04

Me neither. This thread has been highjacked enough already.

Muthu
http://www.edison.co.in/

LionelHutz (Electrical) 12 Jan 10 9:54

It appears the pipe starts empty. How big is this pipe?

The reason to open the valve a little to bleed the air has not been exactly spelled out yet. If the valve was fully open while the pipe is empty then the pump would probably overloads the motor. So, the steps you outline keep the pump from putting more than full load on the motor while the pipe is filled. This is why I ask how big a pipe, or maybe better how long it takes to fill. It won't be a large overload and if it only takes seconds to fill the pipe then bleeding the air out first likely doesn't really matter much. The air will work it's way out by travelling down the pipe. There is no need to get rid of the air for the system to work correctly.

I guess there could be a concern that whatever is downstream of the pump doesn't like having air pumped to it requiring the air is bled out of the pipe...

As for the other arguement - just because a number of others call an axial flow machine a centrifugal machine doesn't mean I have to. I'm a little dissapointed when considering that passing on the operating principal and hence the reason for the name of both types is much more important then arguing if a term used is an "industry accepted" description or not.

---

electricpete (Electrical) 12 Jan 10 22:41

I am disappointed that you are disappointed, Because either you are reading a different thread than I am, or don't really understand what actually transpired in the current thread.

There was never any question or debate regarding operating principles of pumps in this thread. (If you disagree with a statement, please quote it so I can explain it to you).

What there was... was a correct statement in my FAQ that radial, mixed, and axial flow pumps are commonly referred to as centrifugal pumps. It was a statement about terminology, not operating principle.

The terminology was incorrectly challenged. The challenge was refuted with many reputable sources. Instead of acknowledging the error of the challenge, the challenger accused me of passing on misconceptions. I suppose Mr. Karassik should also be so accused. How dare he describe common pump terminology without first seeking approval from the self-appointed pump terminology experts on the eng-tips motor forum! Somehow, I don't think he is too concerned that he lacks the approval of this self-important group. Neither am I.

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Skogsgurra (Electrical) 13 Jan

10
2:19

Scotty

I had a few tough moments before getting your drift. A smiley would have put me on the track. You spell trouble...

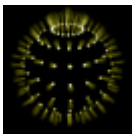
Gunnar Englund
http://www.gke.org/
---
100 % recycled posting: Electrons, ideas, finger-tips have been used over and over again...

ScottyUK (Electrical)

13
Jan
10
7:33

Sorry skogs,

It was a semi-serious comment: he's been using his pet phrase in other threads where it got a wry smile the first time but after the tenth time it has just become irritating.


If we learn from our mistakes I'm getting a great education!

LionelHutz (Electrical)

13
Jan
10
17:11

Geeze, still arguing about a name.... It was pointed out that an axial flow pump is not a type of centrifugal pump because it does not rely on centrifugal force. This is an engineering forum, not a "how are terms commonly used" forum.

If you want to include that comment, then you should further explain that many in the industry will call an axial flow machine a centrifugal machine even though, technically, they are not centrifugal machines.

If you know that an axial flow machine does not use centrifugal force yet still want to apply the "centrifugal" then fine, that's your choice. But why muddy up information that others are reading, when they might not have a clear understanding of the basic operating principles behind each type of pump?

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electricpete (Electrical) 14 Jan 10 22:30

One more reference - a **Hydraulic Institute / ANSI standard** uses the term "centrifugal pump" as equivalent to "rotodynamic pump" (which unequivocally includes axial flow pumps). See **http://estore.pumps.org/Rotodynamic-Centrifugal-Pump-Applications-ANSIHI-13-P50C0.aspx** ....."Rotodynamic (Centrifugal) Pump Applications (ANSI/HI 1.3)"

> **Quote:**
> Geeze, still arguing about a name....

My sentiments exactly. Please go back and look how this started. I did not correct anyone. Someone tried to "correct" my description of commonly used terminology (7 Jan 10 18:26). I responded first with solid factual basis for my statement which has not been refuted (and I'm pretty sure will not be refuted). Then I offered "What you call it is not particularly important to me... ". And yet there followed direct personal attacks (8 Jan 10 16:44) and further attempts to "correct" my terminology which continue through the most recent post.

> **Quote:**
> If you know that an axial flow machine does not use centrifugal force yet still want to apply the "centrifugal" then fine, that's your choice.

You mean: do I want to describe/follow the terminology of Karassik and Hydraulic Institute and Goulds pumps? Yes I have no problem with that.

But please note I made statements about terminology, not principles of operation. If someone else wants to embark on a discussion of principles of operation, then power to them.... it will not contradict anything I said.

However, for those that care enough about the terminology to want to challenge that common/standard terminology cited, I imagine they will want to think through their strategy for describing mixed flow pumps. Does all the fluid energy added in a mixed flow pump come from centrifugal acceleration? No. Is there a continuum between radial flow and axial flow? Yes. Does an axial flow pump have a radial component of flow? Yes. Exactly where do you draw the line? Beats me. Are these issues relevant and important to our decisions on terminology? Not if we simply utilize the common/standard terminology that I cited....but these might be important questions to think through if you want to proclaim that Hydraulic Institute's pump terminology is wrong

> **Quote:**
> But why muddy up information that others are reading, when they might not have a clear understanding of the basic operating principles behind each type of pump?

Some analogies....
* I know that a.c. stands for alternating current, yet I still use the term ac even when referring to a voltage.
* I also know that a transmission line is not a "line" but a curve. Yet still I use the term line.
* I know that an FFT is an algorithm, not a result, but I still use FFT to refer to the result.
* I know an ignition coil is an autotransformer, but I still call it a coil.
* I know that an instantaneous trip function does not operate instantaneously, but I still call it instantaneous.

These are my choices. I am not overly concerned about muddying up the information for folks who might wander by that are not electrical engineers... because this is an engineering forum....

> **Quote:**
> This is an engineering forum, not a "how are terms commonly used" forum.

My sentiments exactly. This is an engineering forum, not a terminology forum. As such we should not have to apologize for using or describing common/standard terminology simply because it might confuse some unfamiliar people.

> **Quote:**
> If you want to include that comment, then you should further explain that many in the industry will call an axial flow machine a centrifugal machine even though, technically, they are not centrifugal machines

I wouldn't say it exactly the way you said it, since that presupposes a definition of centrifugal machines which is different than what was cited above. But I might perhaps instead revise the FAQ to clarify that the common/standard terminology which I alluded to may be somewhat counterintuitive (I have already used quote marks around the word "centrifugal" and added the words"commonly referred to" in order to highlight this aspect, but apparently it was not enough). I will consider that as a potential future enhancement.

Did I mention, I don't care what you call it? 

Time to move on imo.

==========

Skogsgurra (Electrical) 15 Jan 10 1:21

Yes Pete. You do care. A lot. Too much, I would say. And to often.

I think that you could benefit from stepping back and take a more relaxed view on things. This 'discussion' - quarrel is a better word - started when someone remarked that an axial flow pump and a centrifugal pump are not at all the same thing. A 100 percent correct statement. And very relevant in a thread where torque and current characteristics of a pump an drive is discussed.

It could have stayed there. I say no more.

Yes, I say one more thing: Latin Centrum means center or midpoint and latin Fugare means escape. So, a centrifugal fump uses the effect that material escapes from the center when subject to a circular motion. That does not describe the action of an axial flow pump.

Gunnar Englund
http://www.gke.org/
---
100 % recycled posting: Electrons, ideas, finger-tips have been used over and over again...

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electricpete (Electrical) 15 Jan 10 9:06

My FAQ is 100% correct based on the authoritative references that I cited. There is no benefit from further discussion.

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electricpete (Electrical) 15 Jan 10 9:13

"There is no benefit from further discussion."
should have read
"It is time to move on imo"

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LionelHutz (Electrical) 15 Jan 10 9:33

Pete - You must recognize the fact that people can be misunderstood when they use a term common to them yet this common term is not understood by the other person in the discussion? This can be as simple as using the initials PL and the other person not knowing what the initials mean. Or more complex and using "centrifugal pump" when discussing your axial flow pump and the other person in the discussion assuming it's a radial flow pump.

I should have posted this is an "Engineering **Tips** forum". The purpose of the forum is to help people learn, not for people who already know...

Gunner - Maybe you need to say a axial flow pump and *radial* flow pump are not at all the same thing???

electricpete (Electrical)

15 Jan 10 10:15

Thanks for your comments Lionel. I mentioned I may enhance the FAQ. For the time being I am going to leave the last-updated date stamp (Edited 6 Jan 10) which shows the exact FAQ in question PRIOR to comments made about it in this thread (comments started 7 Jan 10).

> **Quote (electricpete FAQ):**
>
> **How does hp change with flow for a "centrifugal pump"**
> **FAQ237-1543: How does hp change with flow for a "centrifugal pump"**
> Posted: 13 May 09 (Edited 6 Jan 10)
>
> Most people think increased flow on a centrifugal pump always means increased current. It is true for radial flow centrifugal pumps, but not for mixed flow or axial flow pumps (which are also called centrifugal pumps in common terminology)....

I do not see that describing common/standard terminology (by stating that mixed and axial pumps are commonly referred to as centrifugal pumps) promotes any misunderstanding of the term "centrifugal pump" whatsoever. Quite the contrary, it helps avoid misunderstandings for the exact reasons cited...people unfamiliar with this usage would be inclined to exclude axial flow (and perhaps mixed flow?) pumps from the term "centrifugal pump". If you are saying that someone might misunderstand "axial flow" on the basis of this statement, I would think that's a stretch.... The terms radial-flow pump, mixed flow pump, axial-flow pump when used together are self-explanatory (in contrast to "centrifugal pump"), and it should be clear from the sentence structure that the purpose of the statement was to elaborate the definition/useage of centrifugal, not that of axial and mixed.

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