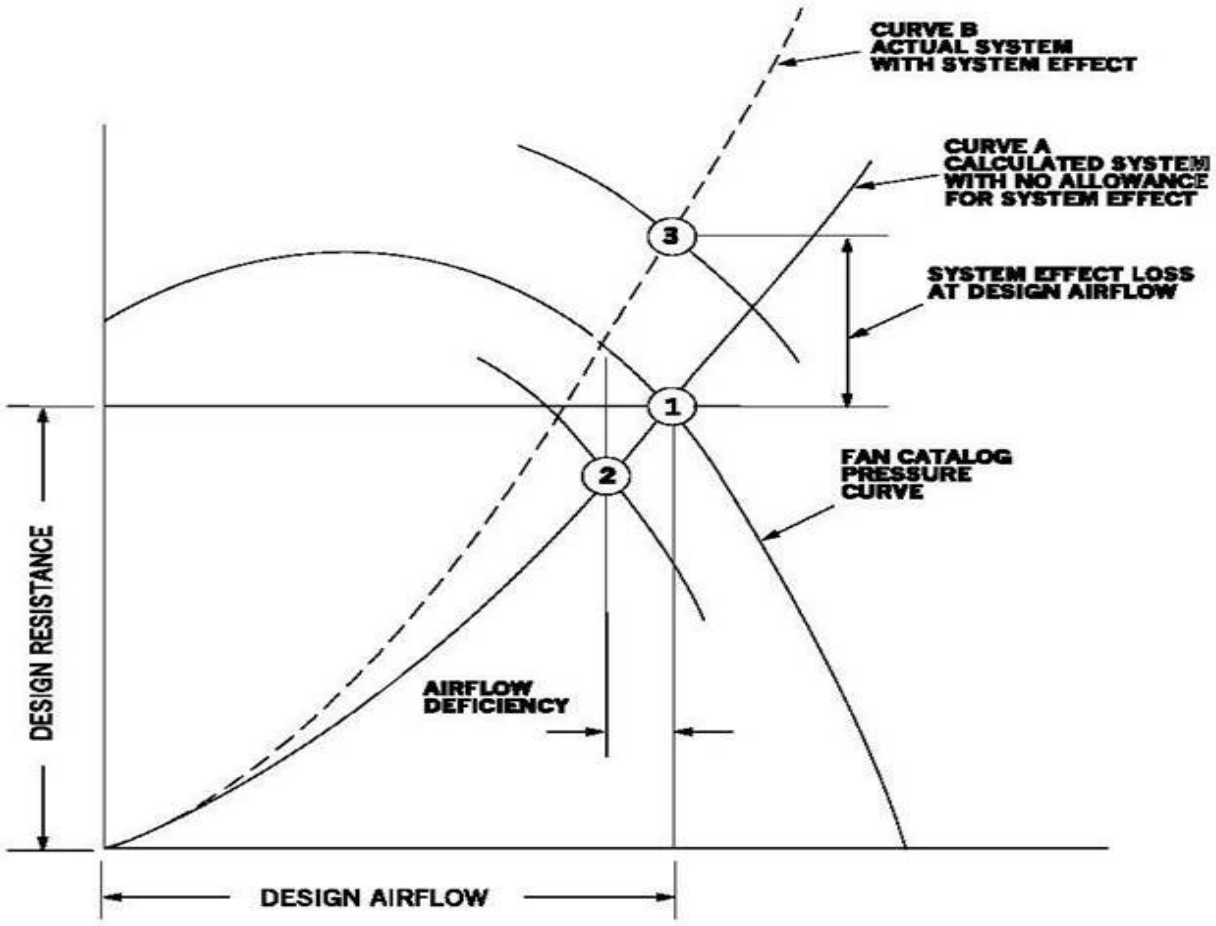
ASHRAE Qatar Oryx Chapter

NEWSLETTER

APRIL 2012

IMPORTANCE OF SYSTEM EFFECT TO DETERMINE FAN CATALOGUE PERFORMANCE

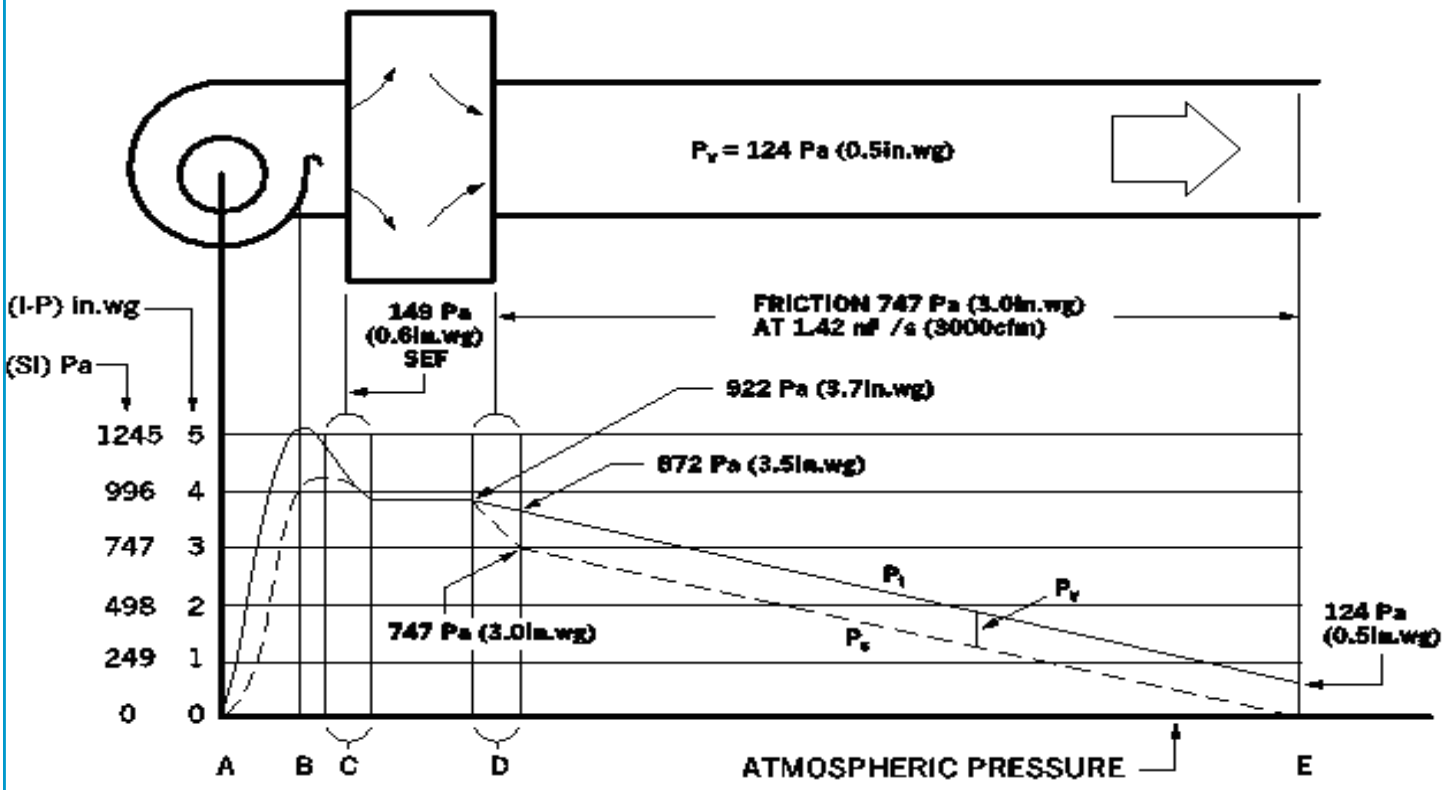
We always encounter deficient fan performance after installation, the first question comes in mind "Proposed fan under sized or wrong Fan rpm" but practically it is just opposite, not always 100% but yes 90% cases are the same. There is a terminology called "System Effect Factor", as per AMCA 201-02, after calculating all ESP, we should always check the system & the fan location, if 100% EDL (Effective duct length) not maintained before & after the fan, we should add system effect factor (SEF) to the calculated system pressure losses to determine the actual system loss, below one graph to show the actual deficiency.



ASHRAE Qatar Oryx Chapter
NEWSLETTER
APRIL2012

IMPORTANCE OF SYSTEM EFFECT TO DETERMINE FAN CATALOGUE PERFORMANCE

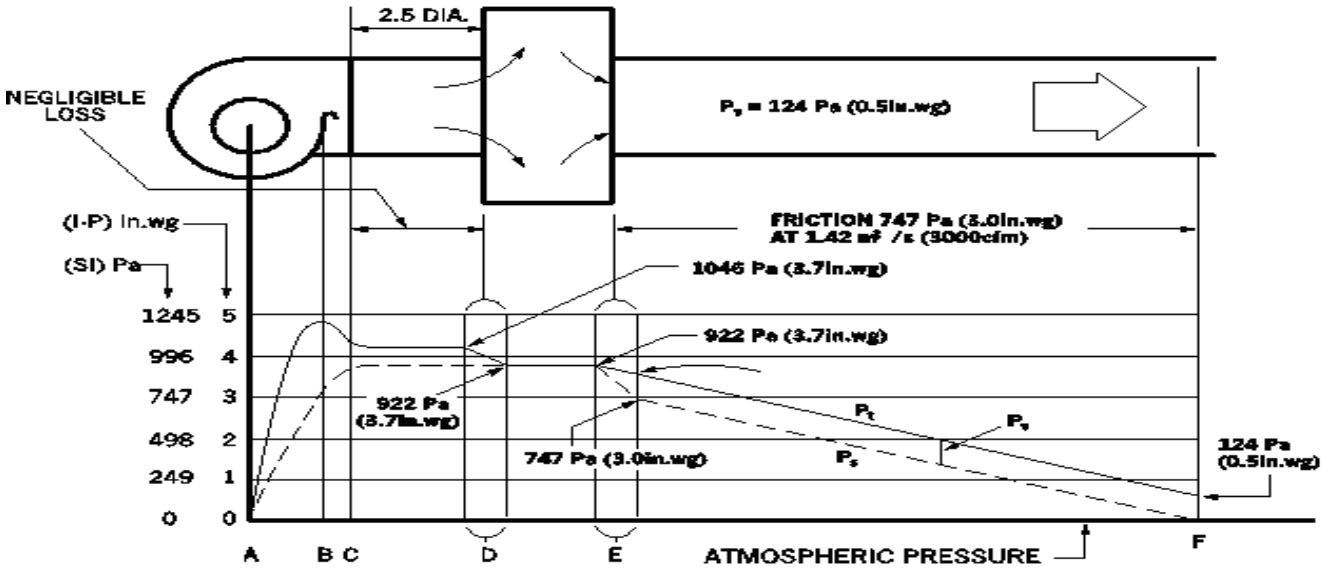
Below one example with a plenum with & without EDL (From AMCA Publication 201-02):



D-E	duct friction at 5000CMH (Q)	747 Pa (duct design)
D	contraction loss-plenum to duct	50 Pa (part of duct system)
D	P_S energy required to create velocity at D	125 Pa (part of duct system)
B-C	**SEF**	**149 Pa**
B-C	P_V loss (also P_T loss) at C as result of air velocity decrease P_S does not change from duct to plenum at C	0 Pa
		----------
REQUIRED Fan P_S		**1071 Pa**

ASHRAE Qatar Oryx Chapter
NEWSLETTER
APRIL 2012

IMPORTANCE OF SYSTEM EFFECT TO DETERMINE FAN CATALOGUE PERFORMANCE



E-F	duct friction at 5000CMH (Q)	747 Pa (duct design)
E	contraction loss-plenum to duct	50 Pa (part of duct system)
E	P_S energy required to create velocity at E	125 Pa (part of duct system)
D	P_V loss (also P_T loss) at D as result of air velocity decrease P_S does not change from duct to plenum at D	0 Pa
C-D	outlet duct on fan as tested	0 Pa
REQUIRED Fan P_S		**922 Pa**

So what should be the rule of thumb?

- Minimum 2.5 duct diameters on Outlet
- Minimum 3 to 5 duct diameters on Inlet
- Avoid inlet swirl
- Allow enough space in the building design to allow for appropriate fan connections to the system
- Use allowances in the design calculations when space or other factors dictate less than optimum arrangement of the fan outlet and inlet connections
- Include adequate allowance for the effect of all accessories and appurtenances on the performance of the system and the fan

Mohamad Mokdad
Export Manager
Maico Gulf (Dynair & Elicent)
Board of Governors M.
Ashare-Qatar Oryx Chapter