

Blower 建構的兩種方式

2D Fan or Recirculation Device

Iring Chiu

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热设计 <http://www.resheji.com>

簡介

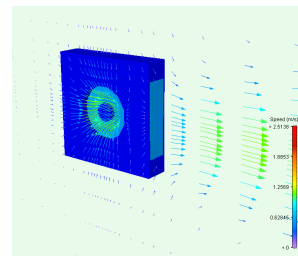
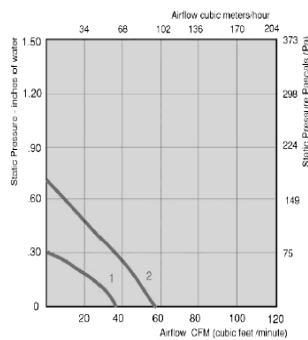
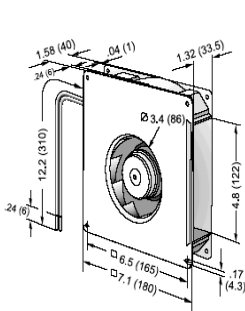
- 近年來對於電子產品多功能與高性能的設計需求，使得電子元件的發熱量快速增加，加上輕薄短小的流行趨勢，使得散熱技術更顯重要挑戰也日益嚴苛。
- 散熱模組內的 **blower** 佔系統內相當重要的地位，在 **FLOTHERM**內如何利用等效的方式建構客戶需求的 **blower** 為在此討論的重要課題。
- 在 **FLOTHERM**內，建構 **blower** 可根據其物理現象分為兩種方式：
 - Enclosure+2D Fan (較針對雙進風的 Case)
 - Recirculation (較針對單進風的 Case)
 - Smartparts3D website Download (最方便的方式)

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Recirculation Device

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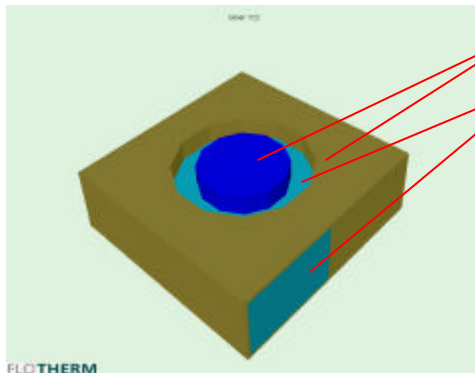
Blower_Recirculation



Recirculation devices can now have fan curves, enabling Blowers (centrifugal fans in cowlings) to be modeled.

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外型建構步驟



1. 利用Cuboid和Prism堆出Blower的幾何外型
2. 拉出 Recirculation , 於 project Manager內對Recirculation點選滑鼠右鍵→construction
3. 選擇 Non-linear Fan curve輸入 Fan Curve
4. 進入Extract & Supply調整 Location & Dimension
5. Recirculation必須貼於實體的面上, 不須有開口就可模擬;但recirculation只能模擬單進風的Blower

P.S Extract為入風口, Supply則為出風口。

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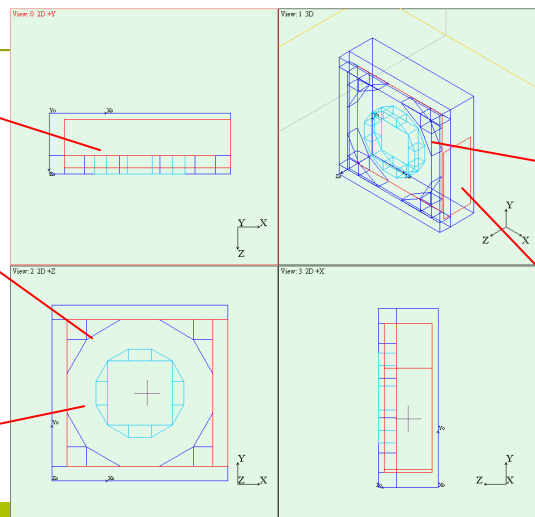
热设计 <http://www.resheji.com>

A Blower model in drawing board

Extract置於入風口的殼層上

利用prisms去建構入口的幾何外型

利用cylinder建構風扇Hub部份



Extract置於入風口的殼層上

Supply置於側面出風口殼層上

Recirculation Setting

Recirculation Device

Name:

Flow:

☐ Volume Flow Rate Flow Rate: m³/s

☐ Linear Fan Curve Pressure: Pa

☒ Non Linear Fan Curve

☐ Normal Velocity at Supply Velocity: m/s

Thermal Properties:

☒ Temperature Change ☐ Heat Input / Extraction Rate ☐ Heat Exchanger

Temperature Change: deg C

Inlet / Outlet Specifications:

Non Linear Fan curves
需給定 P-Q Curve

A 'Sheared' Supply
Direction可選擇
'Constant' 或 'Flow-
Dependent' shear

Supply Specification

All Dimensions In:

Supply Location:

☒ Xo = mm

☐ Yo = mm

☐ Zo = mm

Supply Dimensions:

Xo = mm

Yo = mm

Zo = mm

Free Area Ratio =

Supply Direction:

☐ Normal

☐ Angled

☒ Sheared

Shear

Shear Direction: ☐ Xo ☐ Yo ☐ Zo

Max. Velocity Location:

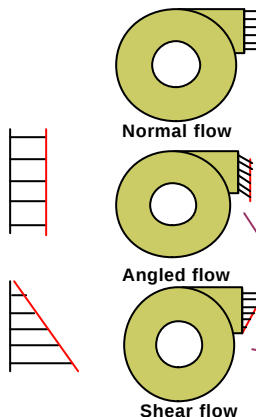
Shear Model:

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Recirculation_Supply

Flow-Dependent Shear

- Equivalent to the treatment of Flow-Dependent Swirl for axial fans in FLOTHERM.
- The operating efficiency is linked to the shear profile.
- Assumption: The most efficient method of delivering the required flow-rate is with a plug profile (assume efficiency = 1.0).
- Any other profile requires more energy to produce the same flow-rate (as energy is proportional to velocity squared) the simple profile shown assumes an efficiency of 0.75.



Supply Specification

All Dimensions In:

Supply Location:

☐ Xo = m

☐ Yo = m

☐ Zo = m

Supply Dimensions:

Xo = m

Yo = m

Zo = m

Free Area Ratio =

Supply Direction:

☒ Normal ☐ Angled ☐ Sheared

Flow Direction

XoN =

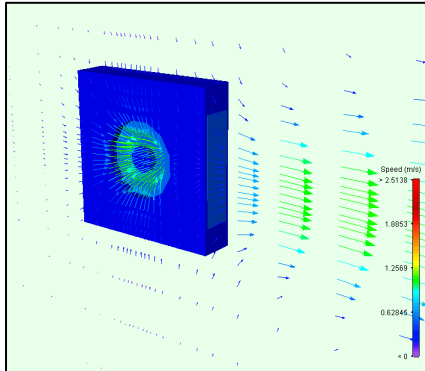
YoN =

ZoN =

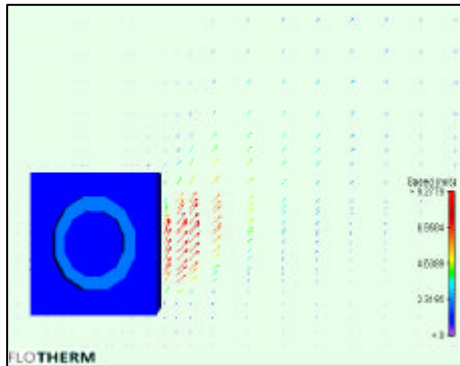
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Outlet Profile

Supply_normal

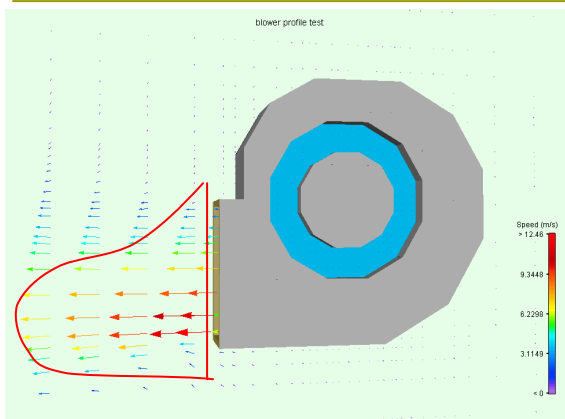


Supply_Angled



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Outlet Profile



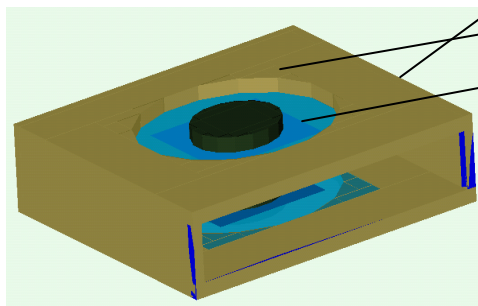
Some blowers have a non-uniform profile. It can be seen that a sheared profile soon develops into the expected profile.

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2D Fan

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建構步驟

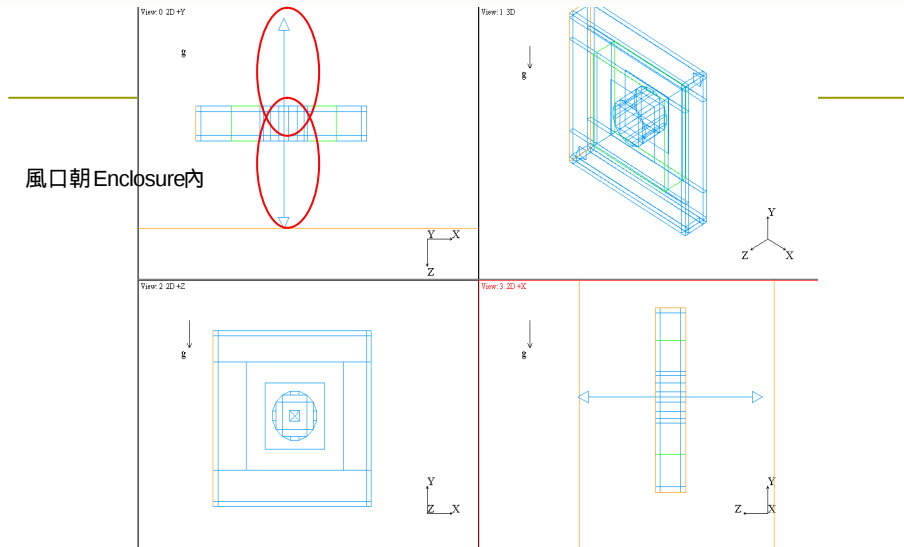


1. 建構 Enclosure，並於上、下面及側面 punch a hole
2. 利用 Prism 及 Cylinder 堆疊出 Blower 圓孔及風扇 Hub 部份
3. 拉出 1 個 Fan 貼於上面孔洞同位置同尺寸，對 Fan 點滑鼠右鍵 → Construction → Model level 選擇 2D+Hub 並輸入 Fan Curve
4. 同上步驟，再貼 2D Fan 於下面孔洞
5. 2D Fan 風向都內朝內，且 2D Fan 的方式主要是建構 **雙進風的 Blower**

P.S 流體經由上下面的風扇將空氣帶入後，再由側邊出風

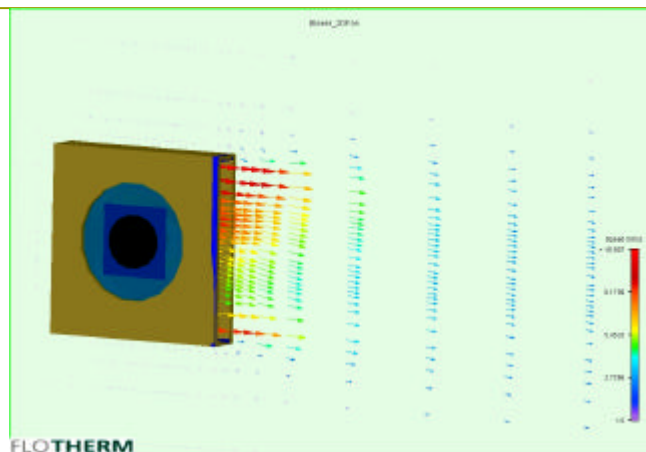
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A Blower model in drawing board



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Outlet Profile



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SmartParts3D Website

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SmartParts3D 網頁



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- Tools for fast selection of parts based on physical/performance characteristics



Questions?

Email us at: info@smartparts3d.com

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使用方式

- 網址：<http://www.smartparts3d.com>
- 沒有帳號及密碼：
 - New Users > User Registration 約3-5個工作天不等原廠寄出認證信
 - 回覆認證信即可
- 已有帳號及密碼：
 - Library > 輸入帳號&密碼 >尋找是否有合適的型號之Blower
 - 直接下載PDML檔案後，以FLOTHERM開啟
 - 修改model