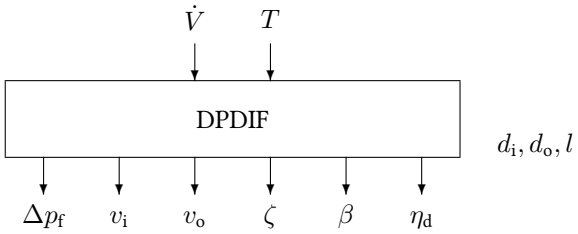
Block DPDIF

The DPDIF block calculates the pressure drop in a diffuser due to friction of an incompressible one-phase turbulent tubular flow.





Name	DPDIF
Function	st0018
Inputs	2
Outputs	6
Parameters	3
Strings	0
Group	S

Inputs

1	Volume flow $\dot{V}$ / $\mathrm{m^3\,h^{-1}}$
2	Air temperature T / °C

Outputs

1	Pressure drop Δp_f / Pa
2	Inlet flow velocity v_i / $\mathrm{m\,s^{-1}}$
3	Outlet flow velocity v_o / $\mathrm{m\,s^{-1}}$
4	Zeta value ζ
5	Opening angle β / °
6	Diffuser efficiency η_d

Parameters

1	Inlet diameter d_i / m
2	Outlet diameter d_o / m
3	Length l / m

Strings

None

Description

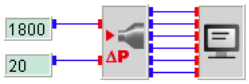
The ζ value of a diffuser can be found from

$$\zeta = \left(1 - (\frac{v_2}{v_1})^2\right)(1 - \eta_d) = \left(1 - (\frac{A_1}{A_2})^2\right)(1 - \eta_d)$$

Values for the diffuser efficiency due Baumgarth/Hoerner/Reeker are given in the following table.

β	3	6	8	10	12	14	16	20	24	30	40
η_d	0.97	0.92	0.89	0.85	0.81	0.77	0.73	0.64	0.53	0.36	0.08

dpdif.vseit



A diffuser with length 1 m is simulated with an inlet diameter of 0.25 m and an outlet diameter of 0.4 m. The volume flow is set to 1800 m^3/h at an air temperature of 20 °C as defined through two CONST blocks.

The SCREEN block displays all outputs of the DPDIF block.

```
6.34972  10.18592   3.97887   0.10302   8.57831   0.87843
```