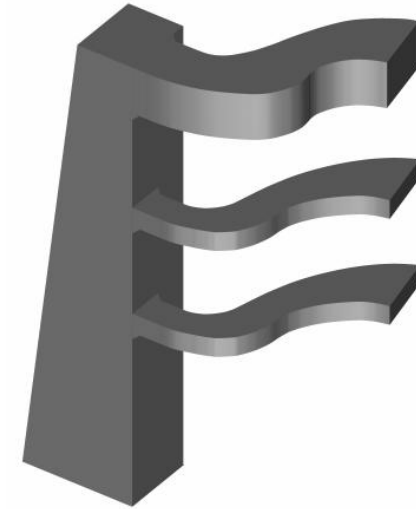
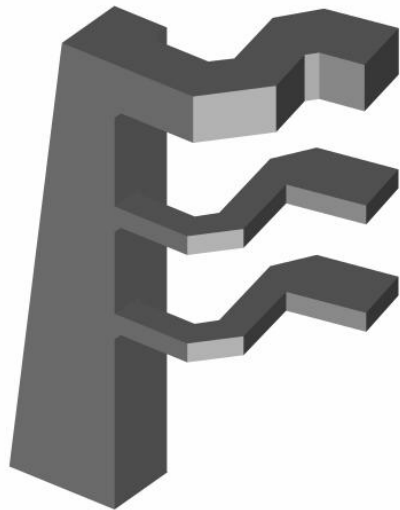


Company presentation:

„Optimising flow for maximum efficiency“



OPTIMISING FLOW FOR MAXIMUM EFFICIENCY



OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

Forkert Technology Services GmbH specialises in optimising flow in units and systems for transporting liquids and gases.

For example:

- valves, pumps, tube elements, intake elements;
- forced and induced draft fans, compressors, turbines;
- power plants, dust exhausting equipments.

Furthermore, we optimise bodies, which move through a medium.

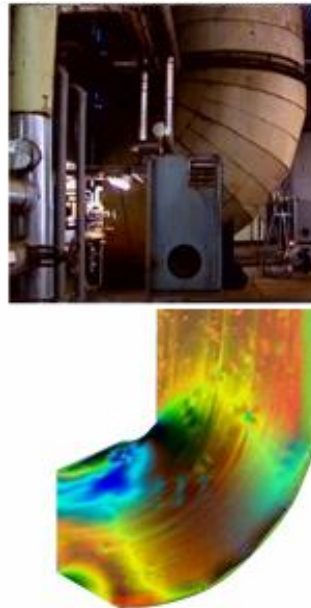
For example:

- hulls;
- cars;
- blade profiles.

OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

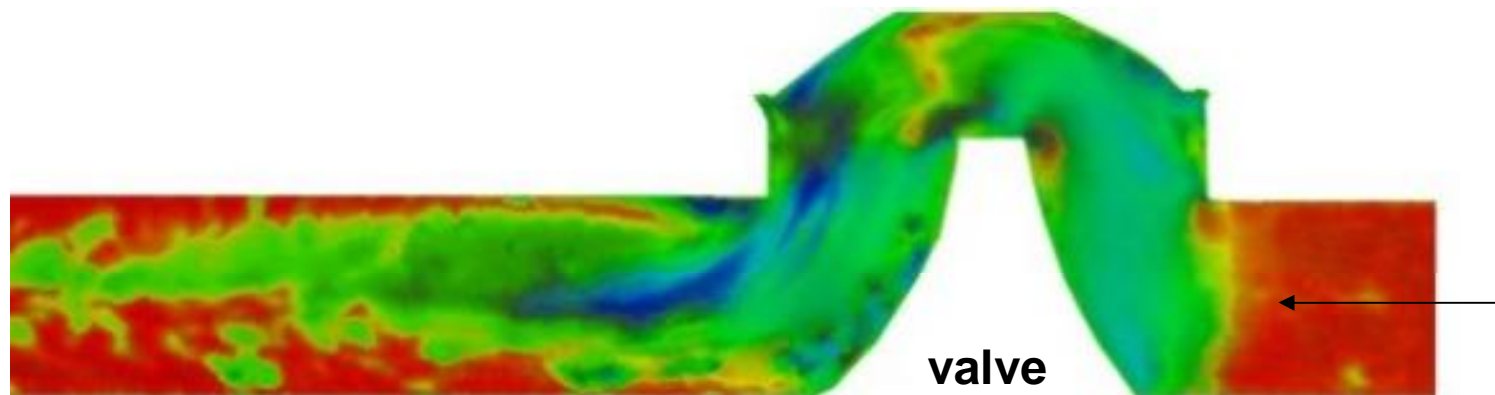
To achieve this, Forkert Technology Services GmbH makes use of a particular optical technology in which specially modulated light is passed through an optically active fluid.

Intake channel of a forced draught fan



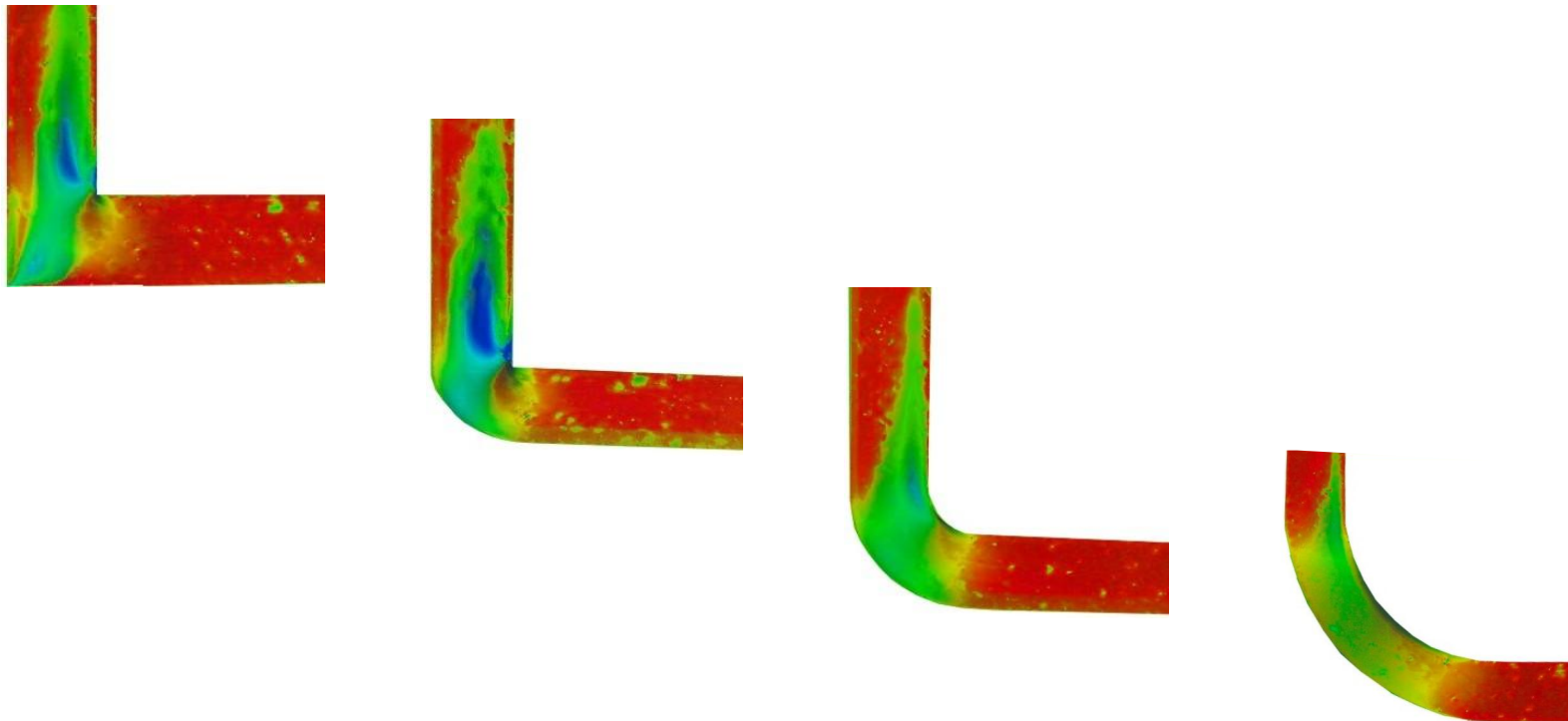
OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

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OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

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OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

This process can be used in the projection of flow channels to improve energy efficiency in industrial processes.

The technology enables the development of units with hugely improved

- energy use properties,**
- acoustic,**
- vibration**

and other characteristics .



OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

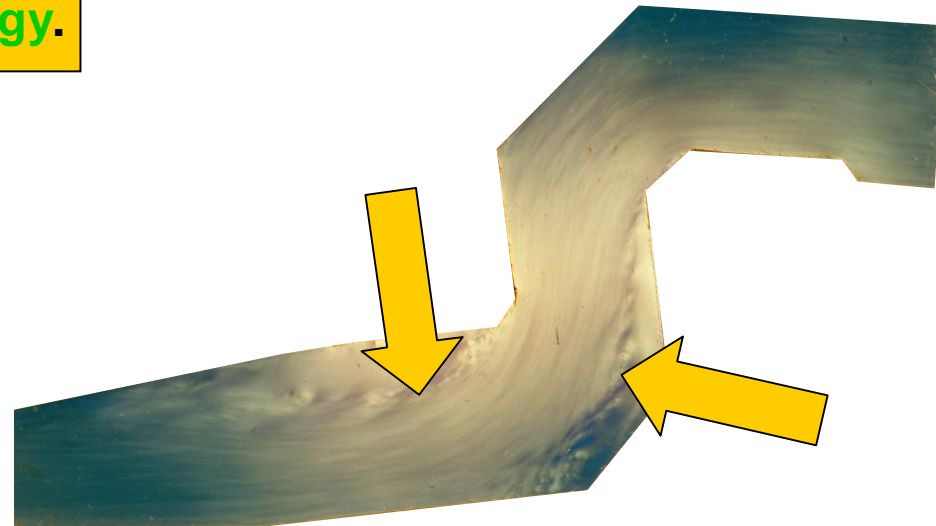
Using similarity laws and experimental equipment with optically active fluid realistically simulates flow configurations through or around the unique profiles of a fluidic object.

This approach allows technicians to model the flow of both fluids and gases.

Passing specially modulated light through the optically active fluid as it moves through the flow channels produces a „field of irregularity of optical densities,“ which clearly correlates with the internal structure of the flow (flow configuration).

OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

The main **advantage of the process** is
that it allows one to see
the **line** along which the flow moves
with a **minimum loss of energy.**



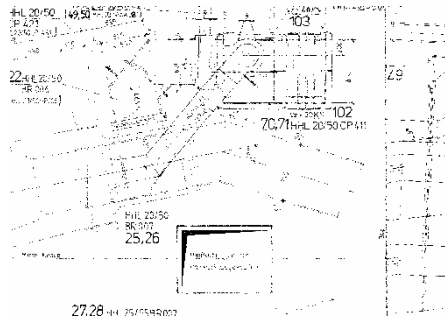
OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

Process of optimising flow



OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

Recording data of the drawing
with a modern CAD program



Create a 3-D model



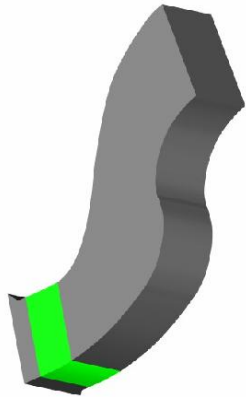
Analysis of the flow conditions

stall = „energy eater“

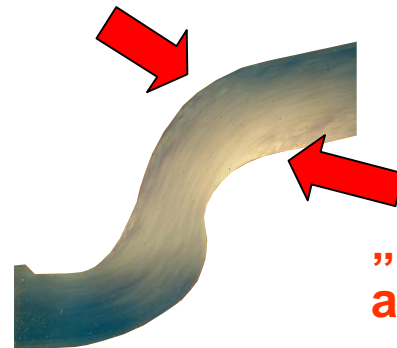


OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

Design and drawing of the optimal spatial structure



Analysis of optimized flow conditions



„Energy eaters“
are eliminated

Construction of models of the original and the optimum



OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

Test of the models on the aerodynamic test stand



Test of the original



Test of the optimum



OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

Test results of the original channel

Coefficient of the pressure loss



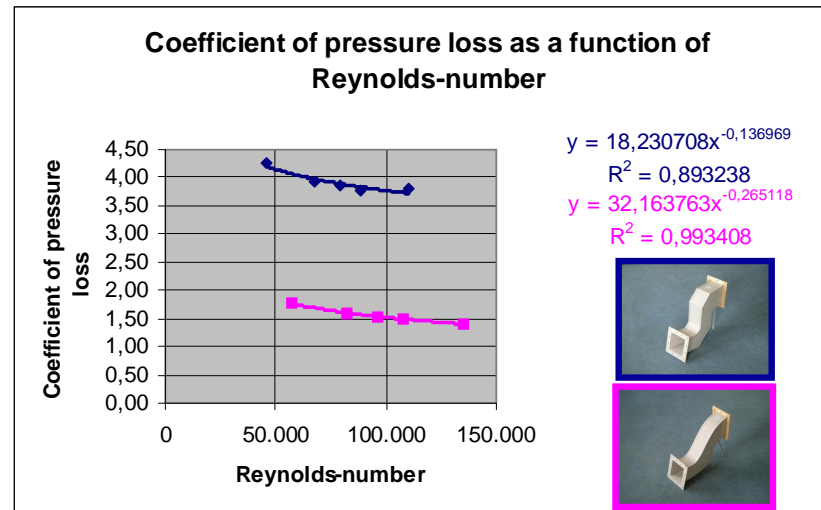
P W	p _{St} Pa	p _{Dy} Pa	ρ kg/m ³	v m ² /s	v _{mitt} m/s	Re	Q m ³ /s	Q m ³ /h	ζ -
809,3	477,35	125,9	1,177	1,5595E-05	14,63	110.682	0,160	575,9	3,79
679,4	304,41	80,6	1,175	1,5622E-05	11,71	88.488	0,128	461,2	3,78
632,1	248,14	64,4	1,174	1,563E-05	10,47	79.057	0,115	412,3	3,86
568,2	185,00	47,0	1,173	1,564E-05	8,96	67.570	0,098	352,6	3,93
414,9	91,33	21,5	1,172	1,5655E-05	6,06	45.656	0,066	238,5	4,25

Test results of the optimized channel

P W	p _{St} Pa	p _{Dy} Pa	ρ kg/m ³	v m ² /s	v _{mitt} m/s	Re	Q m ³ /s	Q m ³ /h	ζ -
824,0	267,61	190,0	1,172	1,5674E-05	18,01	135.565	0,197	708,9	1,41
668,2	180,82	121,4	1,171	1,5688E-05	14,40	108.308	0,157	566,9	1,49
622,2	146,50	95,4	1,171	1,5693E-05	12,77	96.000	0,140	502,6	1,54
559,4	110,33	69,7	1,170	1,5699E-05	10,91	82.015	0,119	429,6	1,58
418,4	60,57	34,2	1,170	1,5707E-05	7,64	57.432	0,084	301,0	1,77

OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

Graphical representation and comparison of test results



	Re	b	a	ζ
Original channel	100.000	-0,136969	18,23,708	3,767
Optimised channel	100.000	-0,265118	32,163763	1,520

Reduction of pressure loss at the same Reynolds-number (60 %)

→ $\zeta_{opt} / \zeta_{ori} = 0,40!$

OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

Test results of the original channel

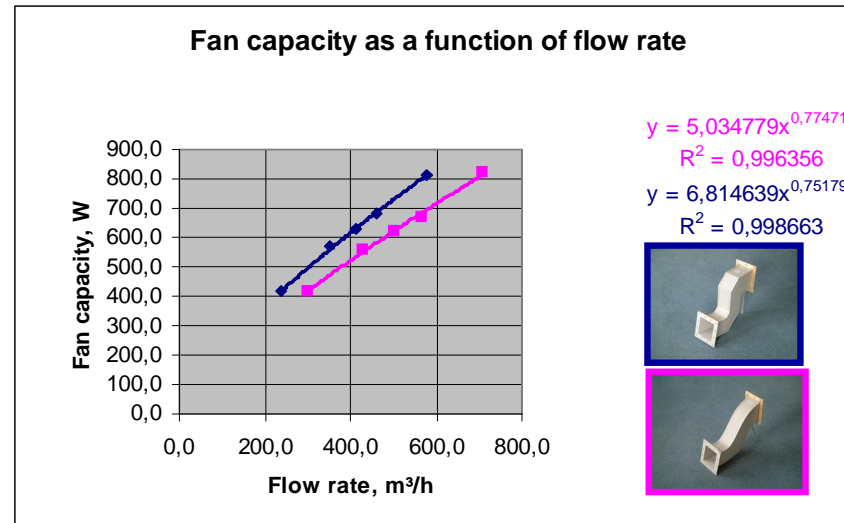
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OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

Graphical representation and comparison of test results



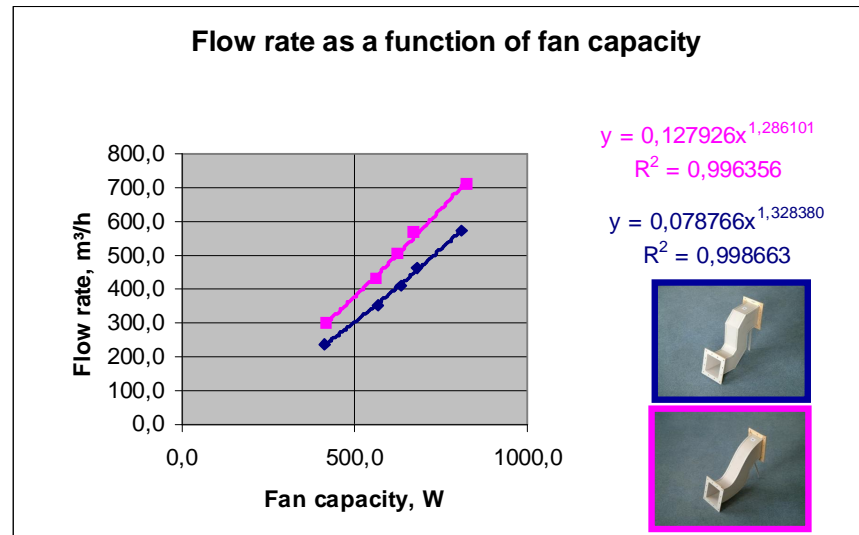
	Q, m ³ /h	b	a	P, W
Original channel	500	0,75179	6,814639	728,6
Optimised channel	500	0,77471	5,034779	620,7

Reduction of energy consumption
at the same flow rate (15 %)

→ $P_{opt} / P_{ori} = 0,85 !$

OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

Graphical representation and comparison of test results



	P, W	b	a	Q, m ³ /h
Original channel	600	1,32838	0,078766	386,2
Optimised channel	600	1,28610	0,127926	478,6

Increase of flow rate at the same energy consumption (24%)

→ $Q_{opt} / Q_{ori} = 1,24!$

OPTIMISING FLOW FOR MAXIMUM EFFICIENCY

Thank you for your attention.

We look forward to a good cooperation.

