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Fluid Mechanics, Internal Flow Series: Record of Documents

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FLUID MECHANICS, INTERNAL FLOW SERIES: RECORD OF DOCUMENTS

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FLUID MECHANICS, INTERNAL FLOW SERIES: RECORD OF DOCUMENTS

1. PREFACE TO FLUID MECHANICS, INTERNAL FLOW SERIES

Design engineers concerned with plant and equipment face an ever-increasing demand for products with a performance which must be substantiated under stringent conditions of cost and environment. The customers for their products are becoming better educated in the ways of achieving, and what can be achieved by, competitively designed equipment. Assuming the skill of the designer, no other single factor can contribute more to the economic preparation of a satisfactory, competitive design than the data upon which that design is based and the speed with which those data can be found and applied.

Fluid flow data, in common with those relating to many other disciplines of concern to the engineer in industry, are widely scattered and when found are of variable quality and relevance to industrial application. The engineering designer does not, generally speaking, have the facilities required to collect and evaluate all the data available which may be applicable to each aspect of the work. Even with the desire to undertake such a task it is unlikely that the necessary time could be allowed to prepare the own data 'working tool' at the expense of time spent in the application of knowledge and experience to the particular job in hand. In any case, the customer will increasingly wish to view the design, not against some locally derived data, but against what can be demonstrated to be the best available data whose integrity is underwritten by a significant cross section of the engineering community concerned with the derivation and application of that data. It is ESDU's purpose to provide data in this and many other fields. ESDU has prepared this information for both the designer and equipment user and, by serving the needs of many, accomplishes the task at much lower cost than could apply to individuals performing it on their own behalf.

Qualified staff collect and evaluate the existing data. Irrelevant or unreliable data are discarded: those remaining are correlated and presented as an authoritative working tool for engineering applications. Technical guidance on individual Data Items is given by Working Parties of specialists drawn from industry, national laboratories and the universities together with other leading specialists. New work is prepared under the guidance of the Fluid Mechanics, Internal Flow Panel, which has the following composition:

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The members of staff of the Engineering Sciences Data Unit concerned are:

Technical Staff

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Miss E. Vitova	—	Engineer – Fluid Mechanics, Internal Flow

2. SECTIONS AND DATA ITEMS

Data Item No.	Title	Amendment Status	ESDUpac	VIEWpac
General				
CFA	Conversion factors.	Sept. 1998		
FMI1	Introductory memorandum on the pressure losses in internal flow systems.	A, Mar. 2007		
Compressible flow relationships				
67035	Jet flow parameters.	B, Mar. 2007		
74028	One-dimensional compressible gas flow in ducts.	D, Mar. 2007		
95011	One-dimensional representation of steady, spatially non-uniform flow. An equivalent mean-value set for compressible flow. Part 1. Implementation for an ideal, calorically-perfect gas.	B, Mar. 2007		
97029	One-dimensional representation of steady, spatially non-uniform flow. An equivalent mean-value set for compressible flow. Part 2. Implementation for an ideal, thermally-perfect gas.	A, Mar. 2007		
03012	Computer program for calculation of mean value properties for non-uniform compressible flows	B, June 2010	A0312v1.0	
Straight pipes				
66027	Friction losses for fully-developed flow in straight pipes.	F, Oct. 2008	A6627v1.0	6627Av1.0
74029	Friction losses for fully-developed flow in straight pipes of constant cross section – subsonic compressible flow of gases.	E, Mar. 2007	A7429v2.1	7429Av2.1
			A7429v2.1	J7429Av1.1
79014	Losses caused by friction in straight pipes with systematic roughness elements.	F, Oct. 2008		
TN08008	CFD studies for the validation of friction losses and flow characteristics in circular straight pipes with smooth walls (Web and CD only)	A, Dec. 2009		
TN08009	CFD validation studies for transitional flow in circular straight pipes with smooth walls (Web and CD only)	A, May 2011		
Bends, branches and junctions				
73022	Pressure losses in three-leg pipe junctions: dividing flows.	A, Mar. 2007		
73023	Pressure losses in three-leg pipe junctions: combining flows.	A, Mar. 2007		
83037	Pressure losses in curved ducts: single bends.	D, Jan. 2007	A8337v1.1	8337Av1.1
77009	Pressure losses in curved ducts: interaction factors for two bends in series.	B, Mar. 2007		

Data Item No.	Title	Amendment Status	ESDUpac	VIEWpac
77029	Pressure losses in curved ducts: coils.	C, Mar. 2007		
Duct fittings and equipment				
66030	Pressure losses in flowmetering devices.	C, Mar. 2007		
69022	Pressure losses in valves.	E, Mar. 2007		
72009	Pressure drop in ducts across round-wire gauzes normal to the flow.	A, Mar. 2007		
74040	Pressure loss during crossflow of fluids with heat transfer over plain tube banks without baffles.	C, Mar. 2007		
79034	Crossflow pressure loss over banks of plain tubes in square and triangular arrays including effects of flow direction.	B, Mar. 2007		
81021	Pressure losses caused by obstructions in ducts or pipes.	A, Mar. 2007		
81039	Flow of liquids. Pressure losses across orifice plates, perforated plates and thick orifice plates in ducts.	C, Mar. 2007		
82009	Compressible flow of gases. Pressure losses and discharge coefficients of orifice plates, perforated plates and thick orifice plates in ducts.	D, Mar. 2007	A8209v1.1	8209Av1.1
TN07007	Incompressible flow through orifice plates – a review of the data in the literature (Web and CD only)	B, Feb. 2012		
Ejectors and jet pumps				
92042	Ejectors and jet pumps: computer program for design and performance for compressible gas flow.	B, Mar. 2007	A9242v2.0	9242Av2.2
93022	Ejectors and jet pumps: computer program for design and performance for liquid flow.	B, Sep. 2008	A9322v1.5	9322Av1.5
85032	Ejectors and jet pumps. Design and performance for incompressible liquid flow.	A, Mar. 2007		
86030	Ejectors and jet pumps. Design for steam driven flow.	A, Mar. 2007		
94046	Ejectors and jet pumps: computer program for design and performance for steam/gas flow.	A, Mar. 2007	A9446v1.0	9446Av1.1
Duct expansions				
72011	Flow through a sudden enlargement of area in a duct.	E, Mar. 2007		
76027	Introduction to design and performance data for diffusers.	B, Mar. 2007		
73024	Performance of conical diffusers in incompressible flow.	C, Jan. 2004		
74015	Performance in incompressible flow of plane-walled diffusers with single-plane expansion.	A, Mar. 2007		

Data Item No.	Title	Amendment Status	ESDUpac	VIEWpac
75026	Performance of circular annular diffusers in incompressible flow.	C, Mar. 2007		
87015	Performance improvement of axial diffusers for incompressible flow.	B, Mar. 2007		
90025	Performance of conical diffusers in subsonic compressible flow.	A, Mar. 2007		
TM19	Effects of truncation on diffuser performance.	Oct. 2010		
Duct contractions				
05024	Flow through sudden contractions of duct area: pressure loss and flow characteristics	B, Oct. 2008	A0116v1.0	0116Av1.0
TN06023	CFD Validation studies for pressure loss and flow characteristics in sudden contractions (Web and CD only)	A, Mar. 2007		
Rotating machinery				
07004	Flow in rotating components – discs, cylinders and cavities.	A, April 2010		
09004	Labyrinth seal flow	June 2009		
Two-phase flow: guides to pressure drop related problems				
CF2	Conversion factors for fluid flows.	Dec. 1978		
FMI2	Guide to the flow relationships and statistical methods used in the Data Items on two-phase flow pressure gradients in straight pipes.	B, Mar. 2007		
78018	Guide to calculation procedures for solving typical problems related to pressure drop in two-phase flow.	A, Mar. 2007		
88014	Computer program for the prediction of air-lift pump performance.	B, Mar. 2007	A8814v2.0	8814Av1.1
Two-phase flow: pressure losses in pipes				
76018	The frictional component of pressure gradient for two-phase gas or vapour/liquid flow through straight pipes.	D, Mar. 2007		
01014	Frictional pressure gradient in adiabatic flows of gas-liquid mixtures in horizontal pipes: prediction using empirical correlations and database.	Apr. 2002 A, Nov. 2012		
04006	Pressure gradient in upward adiabatic flows of gas liquid mixtures in vertical pipes.	A, Feb. 2008 B, Nov. 2012		
77016	The gravitational component of pressure gradient for two-phase gas or vapour/liquid flow through straight pipes.	B, Mar. 2007		

Data Item No.	Title	Amendment Status	ESDUpac	VIEWpac
78001	The momentum-change component of pressure change in two-phase flow and other non-equilibrium effects.	A, Mar. 2007		
89012	Two-phase flow pressure losses in pipeline fittings.	A, Mar. 2007		
Non-Newtonian flow				
97034	Non-Newtonian fluids: Guide to classification and characteristics.	A, Feb. 2004		
95012	Non-Newtonian fluids: obtaining viscometric data for frictional pressure loss estimation for pipeflow.	B, Feb. 2004		
04005	Non-Newtonian fluids: tube viscometry worked example	Feb. 2004		
91025	Non-Newtonian fluids: frictional pressure loss prediction for fully-developed flow in straight pipes.	D, Apr. 1997	A9125v1.0 B9125v1.1	9125Av1.1 9125Bv1.2
Fans				
79037	A guide to fan selection and performance.	B, Mar. 2007		
Pumps				
80030	Radial, mixed and axial flow pumps. Introduction.	B, Jun. 2003		
80031	Radial, mixed and axial-flow pumps. Size estimation, and specification.	B, Mar. 2007		
81001	Radial, mixed and axial-flow pumps. Glossary of terms.	A, Mar. 2007		
81002	Radial, mixed and axial-flow pumps. Conversion factors.	A, Mar. 2007		
Noise in air-conditioning systems				
82001	An introduction and guide to noise in ventilation, air-conditioning and other ducting systems.	A, Mar. 2007		
82002	Reduction of sound in ventilation and similar air distribution systems.	A, Mar. 2007		
82003	Example to illustrate the use of Data Items on noise from ducted ventilation and air-conditioning systems.	A, Mar. 2007		
81043	Sound in low velocity ventilation ducts.	C, Mar. 2007		
Fluid transients in pipes and tunnels				
83046	Fluid transients in pipes and tunnels. Speed of propagation of pressure waves.	A, Mar. 2007		
84013	Fluid transients in pipes. Reduction and control of pressure surges in liquids.	B, Mar. 2007		