

Tabelle 4. Mittlere Stromkosten der Kraftwerke nach Tabelle 1

k_B	k_{el} in DM/kWh		
	Kohle	ST	PV
DM/t			
100	0,09	0,21	0,48
150	0,11	0,22	0,49
220	0,14	0,24	0,51

Kosten des Sonnenstromes deutlich über denen des Kohlestroms, und zwar besonders ausgeprägt bei dem photovoltaischen Verfahren. Dabei ist zu berücksichtigen, daß wegen des Verbundes von Solarkraftwerk und Hilfskapazität bereits eine Mischkalkulation für den Sonnenstrom vorliegt und die Investitionskosten niedrig angesetzt wurden. Mit einem unspezifizierten Reserveposten von 320 Mio. DM schätzt F.G. Casal [17] die Kosten des reinen Sonnenstroms aus solarthermischen Kraftwerken sogar auf 0,51 DM/kWh. Der Durchbruch zur Wirtschaftlichkeit des Sonnenstroms kann nur dann gelingen, wenn sich die Anlagekosten entscheidend senken lassen.

Schrifttum

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BUCHER

Gas Entrainment by Plunging Liquid Jets. Von A.K. Biñ (Inhalt des dieser Zeitschrift angegliederten VDI-Forschungsheftes 648). 36 S., 29 Bilder, 1 Tabelle, 92 Literaturhinweise, Preis 109,- DM, für VDI-Mitglieder 98,10 DM.

In the paper an extensive survey of the results of experimental and theoretical research on gas entrainment by plunging liquid jets has been presented. The mechanism of gas entrainment is discussed showing the effects of the basic hydrodynamic parameters (jet velocity and length, liquid physical properties and nozzle design). For laminar viscous jets gas is entrained in form of a thin film which breaks up into bubbles. For low viscosity jets the mechanism of entrainment is related to the jet surface instability and the interaction of disturbances on its surface with the pool liquid. At higher jet velocities gas friction forces become important. As a result,

gas is captured by the jet roughness and in the boundary layer developed along the jet. The conditions of the onset of gas entrainment are discussed. Two regions of the onset of entrainment can be distinguished (the droplet and the continuous jet regions). Some empirical relationships for these regions have been obtained. Also, for the droplet region of the onset of entrainment some correspondence to the relationships suggested previously for the breakup length of jets has been pointed out.

The curves for the volumetric flow rates of the entrained air indicate three or even four regions: low velocity, transition, and high velocity regions. For each of them possibly all available experimental data due to different authors have comprehensively been compared and discussed, resulting in recommendations of quantitative relationships enabling calculation of the volumetric flow

rates of the entrained air or the ratio Q_A/Q_W . The effect of the basic system parameters (jet velocity and length, nozzle design, angle of jet inclination, jet power and physical properties) is thoroughly discussed.

Based on the experimental data characteristics of the resulting bubble dispersion (bubble size, depth of bubble penetration, gas holdup and bubble residence time) are given. Mass transfer in the plunging jet absorber for the two types of systems: oxygen-water and carbon dioxide-water, is considered. Special emphasis has been put on the first of them since it offers potential applications in chemical, fermentation and waste treatment processes. The hitherto obtained experimental data on mass transfer in plunging jet systems have thus been reviewed, and some examples of their practical applications briefly discussed.

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