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LITERATURE SURVEY ON
VERTICAL TUBE EVAPORATORS (VTE's)

PART I

BIBLIOGRAPHICAL ENTRIES

July 1977

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LITERATURE SURVEY ON
VERTICAL TUBE EVAPORATORS (VTE's)

PART I

BIBLIOGRAPHICAL ENTRIES

ABSTRACT

A bibliography of the literature pertinent to vertical tube heat exchangers for OTEC application has been prepared. More than 200 references from different sources (journals, books, companies and government reports) on heat exchanger design, operation and performance have been identified and surveyed for a two part report on the state-of-the-art of vertical tube evaporators. This bibliography represents Part I. Each bibliographical entry has been coded to facilitate references to particular articles in the narrative account of the survey represented in Part II.

LITERATURE SURVEY ON
VERTICAL TUBE EVAPORATORS (VTE's)

PART I

BIBLIOGRAPHICAL ENTRIES

Table of Contents

Guide to Use of Code Symbols	1
Table 1. Authors Referenced	5
Table 2. Books Referenced	8
Table 3. Companies Referenced	9
Table 4. Journals Referenced	10
Table 5. Laboratories Referenced	13
Table 6. Code Breakdown	14
Table 7. Subject Index	24
Table 8. Bibliography	33
Category I. Mechanism of Boiling and Condensation	33
Category II. Thermosiphon Reboiler	34
Category III. Hydrodynamics	36
Category IV. Heat (Mass) Transfer	38
Category V. Non-Aqueous Systems	43
Category VI. Design of Plants	44
Category VII. Ocean Thermal Energy Conversion (OTEC)	47
Category VIII. General References	51

GUIDE TO USE OF CODE SYMBOLS

Each bibliographical entry listed in Table 8 is assigned a code which breaks down into the following six parts:

- Category (I,II,III,IV,V,VI,VII, or VIII);
- Reference Number (001,002,....,203);
- Journal (J) or Book (B);
- OSW (Office of Saline Water), ERDA (Energy Research and Development Administration), or NSF/RANN (National Science Foundation);
- Author (A), Company (C), or Laboratory (L);
- Year.

Each part of the code is separated by a hyphen.

Example: VII-155-J28-ERDA-A107-75.

A star (*) indicates a missing part, and is unhyphenated.

Examples: (a) I- 001 * OSW- A01- 64;
 (b) II- 012- J07 * A11- 66;
 (c) VII- 160 * NSF/RANN- A113- 74;
 (d) VII- 177- J33 * L02- 76.

Examples (a) and (c) exclude either a Journal (J) or a Book (B). Hence, the third part of their codes is starred. Examples (b) and (d) exclude either OSW, ERDA or NSF/RANN. Hence, the fourth part of their codes is starred.

The surveyed literature has been divided into eight categories, each of which is indicated by a Roman numeral. The eight categories are:

I. Mechanism of Boiling and Condensation

This category focuses on the physics of the actual change of state taking place in the heat exchanger. In boiling, the concern is whether

nucleation or film evaporation takes place. In condensation, the concern is whether dropwise or film process takes place.

II. Thermosiphon Reboiler

The concern here is with complex two phase flow processes involving natural circulation. No single mechanism controls the whole process. This category is common when tube-side change of state takes place. Critical problems are: onset of nucleation, slug flow, instability in the heat exchanger, excessive pressure drop, vapor locking and fluid stratification.

III. Hydrodynamics

The focus here is mainly on the fluid-mechanical nature of waves in falling liquid films and their relationship to stable regimes of flow. Flow on the shell side of horizontal and vertical tube bundles is also included in this category.

IV. Heat (Mass) Transfer

In this category, emphasis is on the transfer of heat or component mass in fluid systems undergoing changes of phase. The references especially examine heat transfer associated with evaporation and condensation. Major emphasis is on vertical tube evaporators using fresh or sea water.

V. Non-Aqueous Systems

The concern here is with the influence of fluid properties such as viscosity, density, and thermal conductivity on the heat transfer process. The effect of contaminants on heat transfer is also included in this category.

VI. Design of Plants

This category focuses on the design and performance evaluation of single and multi-effect (stage) heat exchangers used in desalination. Emphasis is given to experience with vertical tubes with and without fluting.

VII. Ocean Thermal Energy Conversion (OTEC)

This category is mainly confined to OTEC-related heat exchanger concepts as reported by ERDA contractors at the Third and Fourth OTEC Workshops.

VIII. General References

This category deals with General References on the methodology of the design of heat exchangers. It reports on the status of large heat exchange systems in desalinization and other applications.

All references listed in the bibliography are numbered chronologically. The second part of the code (001,002,...,203) specifies the Reference Number.

All Journals, Books, Authors, Companies and Laboratories are numbered chronologically as they appear in bibliographical entries. Once a Journal, Book, Author, Company or Laboratory is given a number, it is specified by that number throughout.

In Table 1, a listing of Authors numbered in accordance with numbers that appear in the code for bibliographical entries that specify the author is given. Where there is more than one author, only the first author is coded. The appropriate Category(ies) and Reference Number(s) for each author are listed.

In Table 2, a listing of Books numbered in accordance with numbers that appear in the code for bibliographical entries that include books is given. The appropriate Category(ies) and Reference Number(s) for each book are listed.

In Table 3, a listing of Companies numbered in accordance with numbers that appear in the code for bibliographical entries that specify the company is given. The appropriate Category(ies) and Reference Number(s) for each company are listed.

In Table 4, a listing of Journals numbered in accordance with numbers that appear in the code for bibliographical entries that include journals is provided. The abbreviated form for each Journal as it appears in the bibliographical entry is listed. The number of times each journal appears is indicated. A listing of journals which were consulted but which to date have not contained relevant material is also given.

In Table 5, a listing of Laboratories numbered in accordance with numbers that appear in the code for bibliographical entries that specify the laboratory is given. The appropriate Category(ies) and Reference Number(s) for each laboratory are listed.

If a bibliographical entry lists both a company and an author, only the name of the company is represented in the code. If a bibliographical entry lists both a laboratory and an author, only the name of the laboratory is represented in the code.

A breakdown of the code is provided in Table 6 to help the reader identify the separate parts of the code associated with each bibliographical entry. Each entry of the Code Breakdown includes the relevant subject for that entry given in the abbreviated form specified in column three of the Subject Index.

A Subject Index is provided in Table 7 to assist the reader in locating the bibliographical entry that deals with a particular topic. Key words from each reference are abstracted to suggest a general topic area. Listings are arranged alphabetically. The first column lists topics in alphabetical order as abstracted from references. The second column indicates the Category(ies) and Reference Number(s) from which the topic was taken. The third column lists topics abstracted in abbreviated form. The abbreviated form of subject found in the Subject Index and the abbreviated form of subject found in the Code Breakdown cross reference each other.

TABLE 1. AUTHORS REFERENCED

		<u>Page 1</u>			
<u>Author</u>	<u>Category- Reference Number</u>	<u>Author</u>	<u>Category- Reference Number</u>		
001	Erb, R.A.	I-001,002	024	Ganchev, B.G.	III-036,IV-080
002	Glicksman, L.R.	I-003	025	Godau, H.J.	III-037
003	Harstad, K.G.	I-004	026	Gollan, A.	III-038
004	Jordan, D.P.	I-005	027	Krantz, W.B.	III-039,040
005	Kotake, S.	I-006	028	Marschall, E.	III-041,042
006	Mesler, R.	I-007	029	Massot, C.	III-043
007	Tong, L.S.	I-008	030	Morsy, M.G.	III-044
008	Finkelstein, Y.	I-009	031	Penev, V.	III-045
009	Barba, D.	II-010	032	Pinczewski, W.V.	III-046
010	Borishansky, V.M.	II-011	033	Portalski, S.	III-047,048
011	Bryers, R.W.	II-012	034	Ruckenstein, E.	III-049
012	Chisholm, D.	II-013,014,015,016,017	035	Alexander, L.G.	IV-050
013	Ciborowski, J.W.	II-018	036	Asbjornsen, O.A.	IV-052
014	De Gance, A.E.	II-019, IV-067	037	Barnett, P.G.	IV-053
015	Dukler, A.E.	II-020, III-035, IV-068,069,070,071,072	038	Bliss, H.	IV-055
016	Hughmark, G.A.	II-021	039	Boyadjiev, C.	IV-056
017	Taitel, Y.	II-023,024	040	Brumfield, L.K.	IV-057
018	Tobilevich, N.Y.	II-025	041	Butt, S.H.	IV-058
019	Gottzman, C.F.	II-028	042	Carnavos, T.C.	IV-059
020	Anshus, B.E.	III-029	043	Chandra, V.	IV-060
021	Berbente, C.P.	III-030	044	Chun, K.R.	IV-061,062
022	Cerro, R.L.	III-031,032	045	Churchill, S.W.	IV-063
023	Chu, K.J.	III-033,034	046	Cooper, M.G.	IV-064
			047	Czikk, A.M.	IV-065,VII-159,160

TABLE 1. AUTHORS REFERENCEDPage 2

<u>Author</u>	<u>Category- Reference Number</u>	<u>Author</u>	<u>Category- Reference Number</u>
048	Davies, J.T. IV-066	071	Rifert, V.G. IV-097
049	Edwards, D.K. IV-073	072	Schaal, M. IV-098
050	Elliot, L.C. IV-074	073	Sephton, H.H. IV-099,100
051	Fletcher, L.S. IV-075	074	Shah, B.H. IV-101
052	Ford, J.A. IV-077	075	Shekriladze, I.E. IV-102
053	Frank, K.F. IV-078	076	Simpson, H.C. IV-103
054	Fujii, T. IV-079	077	Sivek, J.R. IV-104
055	Hajdu, H. IV-081	078	Sirois, B.J. IV-105
056	Hickman, R.S. IV-082	079	Thomas, D.G. IV-106,107,108
057	Howard, D.W. IV-083	080	Unterberg, W. IV-109
058	Isenberg, J. IV-084	081	Watkinson, A.P. IV-110
059	Jones, W.P. IV-085	082	Wayner, P.C.Jr. IV-111
060	Kader, B.A. IV-086	083	Webb, R.L. IV-112,113
061	Khan, A.R. IV-087,VI-143	084	Withers, J.G. IV-114
062	Lawn, C.J. IV-088	085	Yoshioka, K.H. IV-115
063	Levin, A.B. IV-089	086	Chaddock, J.B. V-116,117
064	Lustenader, E.L. IV-090	087	Johnston, R.C.Jr. V-118
065	Masliyah, J.H. IV-091	088	Lavin, J.G. V-119
066	Mayhew, Y.R. IV-092	089	Mirmov, N.I. V-120
067	Mills, A.F. IV-093	090	Parizhskiy, O.V. V-121
068	Newson, I.H. IV-094	091	Shah, M.M. V-122
069	Perkins, K.R. IV-095	092	Bezler, P.J. VI-127
070	Prenosil, J. IV-096	093	Briggs, D.E. VI-129

TABLE 1. AUTHORS REFERENCEDPage 3

<u>Author</u>	<u>Category- Reference Number</u>	<u>Author</u>	<u>Category- Reference Number</u>		
094	Burdette, J.W.	VI-130	117	Marshall, J.	VII-171
095	Buskunov, R.S.	VI-132	118	Michel, J	VII-173
096	Campbell, K.S.	VI-133	119	Rothfus, R.R.	VII-175,176,177
097	Coogan, C.H.	VI-134	120	Sabin, C.M.	VII-178,179
098	Ebel, R.A.	VI-135	121	Schmidt, T.E.	VII-180
099	Eissenberg, D.M.	VI-136	122	Suratt, W.B.	VII-181
100	Gull, H.C.	VI-138	123	Van Dusen, E.	VII-182
101	Kays, D.D.	VI-141	124	Zener, C.	VII-184
102	McGowan, J.G.	VI-145,VII-172	125	Afghan, N.H., editor	VIII-185
103	Moran, F.J.	VI-146,147	126	Baughn, J.W., editor	VIII-186
104	Newell, R.B.	VI-148	127	Davis, L.R., editor	VIII-188
105	Robbins, J.	VI-153	128	El-Ramly, N.	VIII-189
106	Spiewak, I.	VI-154	129	Grigull, U., editor	VIII-192
107	Braren, R.	VII-157	130	Hammond, R.P., director	VIII-194
108	Brown, C.E.	VII-158	131	Hetsroni, G., editor	VIII-195
109	Dexter, S.C.	VII-161	132	Irvine, T.F.Jr.	VIII-197
110	Dugger, G.L., editor	VII-162	133	McCabe, W.L., editor	VIII-200
111	Fetkovich, J.G.	VII-163	134	McAdams, W.H.	VIII-201
112	Gregorig, R.	VII-164,VIII-191			
113	Ioup, G., editor	VII-165			
114	Iqbal, K.Z.	VII-166			
115	Jones, P.E.	VII-167			
116	Mangarella, A.	VII-170			

TABLE 2. BOOKS REFERENCED

<u>Book</u>	<u>Category- Reference Number</u>
01 <u>Progress in Heat and Mass Transfer</u> , Volume 6	IV-072, VIII-195
02 <u>Heat Exchangers: Design and Theory Sourcebook</u>	IV-082, VIII-185
03 <u>Proceedings of the 1976 Heat Transfer and Fluid Mechanics Institute Conference</u>	VIII-186
04 <u>Proceedings of the 1974 Heat Transfer and Fluid Mechanics Institute Conference</u>	VIII-188
05 <u>Heat Transfer: Design-Construction Operation-Management</u> , Volume 4	VIII-191
06 <u>Progress in Heat and Mass Transfer</u> , Volume 1	VIII-192
07 <u>Advances in Heat Transfer</u> , Volume 12	VIII-197
08 <u>Unit Operations of Chemical Engineering</u>	VIII-200
09 <u>Heat Transmission</u> , third edition	VIII-201
10 <u>Chemical Engineering Progress Symposium Series</u> , Number 30, Volume 56, 1960	IV-069

TABLE 3. COMPANIES REFERENCED

<u>Company</u>	<u>Category- Reference Number</u>
01 Union Carbide Corporation	II-022, VIII-199
02 Foster Wheeler Energy Corporation	II-027
03 Aqua-Chem, Incorporated	IV-051
04 Fluor Corporation, Limited	IV-076
05 Applied Research and Engineering, Limited	VI-123
06 W.L. Badger & Associates, Incorporated	VI-124
07 Baldwin-Lima-Hamilton Corporation	VI-125
08 Bechtel, Incorporated	VI-126
09 C.F. Braun and Company	VI-128
10 Burns and Roe, Incorporated	VI-131, VI-142
11 General Electric Company	VI-137, VII-190
12 Hittman Associates	VI-139, VIII-196
13 Kaiser Engineers	VI-140
14 Dow Chemical Company	VI-144
15 Ralph M. Parsons Company	VI-151
16 Prengle, Dukler & Crump Company	VI-152
17 Technology Services, Incorporated	VI-155
18 Lockheed Missiles and Space Company (IMSC)	VII-167, 168
19 TRW	VII-183
20 Arthur D. Little, Incorporated	VIII-203

TABLE 4. JOURNALS REFERENCED

<u>Journal</u>	<u>Number of Papers</u>
01 Symposium on Enhanced Tubes for Desalination Plant (Symp. En. Tubes)	16
02 International Journal of Heat and Mass Transfer (Int. J. Heat & Mass Tr.)	26
03 American Society of Mechanical Engineers Heat Transfer Conference (ASME HTr. Conf.)	1
04 American Institute of Chemical Engineers Journal (AIChE J.)	10
05 Nuclear Engineering and Design (Nuc. Engr. Design)	1
06 British Chemical Engineering (Br. Chem. Engr.)	3
07 Proceedings Institute of Mechanical Engineers (Proc. Inst. Mech. Engr.)	2
08 Journal Mechanical Engineering Science (J. Mech. Engr. Sci.)	1
09 Chemical Engineering (Chem. Engr.)	2
10 Industrial and Engineering Chemistry: Fundamentals (Ind. & Engr. Chem.:Fund.)	6
11 American Institute of Chemical Engineers - 71st Meeting (AIChE-71st Meeting)	1
12 International Journal for Multiphase Flow (Int. J. Multiph. Flow)	1
13 Heat Transfer - Soviet Research (Heat Tr.-Sov. Res.)	7
14 Chemical Engineering Progress (Chem. Engr. Prog.)	5
15 Chemical Engineering Science (Chem. Engr. Sci.)	9
16 International Symposium on Fresh Water from the Sea (Int. Symp. Fresh Wat. Sea)	4
17 International Chemical Engineering (Int. Chem. Engr.)	1
18 American Society Mechanical Engineers Papers (ASME Papers)	3
19 American Society Mechanical Engineers - Journal of Heat Transfer (ASME-J. Heat Tr.)	1
20 Industrial and Engineering Chemistry: Process Design and Development (Ind. & Engr. Chem.: Proc. Design Dev.)	3
21 Periodica Polytechnica, Chemical Engineering (Per. Poly. Chem. Engr.)	1
22 American Society of Mechanical Engineers - American Institute of Chemical Engineers Heat Transfer Conference (ASME-AIChE Heat Tr. Conf.)	1
23 Transactions: American Society of Mechanical Engineers - Journal of Heat Transfer (Trans.: ASME-J. Heat Tr.)	4

TABLE 4. JOURNALS REFERENCEDPage 2

<u>Journal</u>	<u>Number of Papers</u>
24 Transactions: American Society of Mechanical Engineers - Engineering for Industry (Trans.: ASME- Engr. for Ind.)	1
25 Desalination (Des.)	4
26 Canadian Journal of Chemical Engineering (Can. J. Chem. Engr.)	1
27 American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)	4
28 Thermal Engineering (Therm. Engr.)	1
29 Chemical Engineering Journal (Chem. Engr. J.)	1
30 Journal Nuclear Science Technology (J. Nuc. Sci. Tech.)	1
31 Z. Angew Math Physics (Z. Ang. Math Phys.)	1
32 Kaltetechnik 15 (Kal. 15)	<u>1</u>
Total	124

TABLE 4. PAGE 3

JOURNALS CONSULTED*

Bulletin of the Japanese Society of Mechanical Engineering
Chemical Engineering Journal
Chemie-Ingenieur-Technik
Chemical Technology
Heat Transfer-Japanese Research
Indian Journal of Technology
Plant Engineering
Proceedings of the Fifth International Heat Transfer Conference,
Tokyo, Japan, September 3-7, 1974
Transactions of the ASME (Series B), Journal of Engineering for Industry
Journal of the International Desalination and Environmental Association
Pure Water

* Journals listed above do not contain relevant material.

TABLE 5. LABORATORIES REFERENCED

<u>Laboratory</u>	<u>Category- Reference Number</u>
01 National Engineering Laboratory: E. Kilbride (Glasgow)	II-014
02 Oak Ridge National Laboratory (ORNL)	II-026 (Gaseous Diffusion Plant) VIII-193, 198, 199, 202
03 United States Naval Civil Engineering Laboratory	IV-054
04 Applied Physics Laboratory (John Hopkins University)	VII-156 (supported by MARAD)
05 Engineering Research Institute (Iowa State University)	VIII-187

TABLE 6. CODE BREAKDOWN

Page 1

<u>Category- Reference Number-</u>	<u>Journal- Book-</u>	<u>OSW- ERDA- NSF/RANN-</u>	<u>Author- Company- Laboratory-</u>	<u>Year</u>	<u>Subject</u>
I-001	*	OSW-	A001-	64	C-D
I-002-	J01-	OSW-	A001-	70	C-D
I-003-	J02	*	A002-	72	C-D
I-004-	J23	*	A003-	75	B-N
I-005-	J02	*	A004-	62	B-N
I-006-	J02	*	A005-	70	B-N
I-007-	J04	*	A006-	76	B-N
I-008-	J05	*	A007-	72	B-N
I-009-	J29	*	A008-	76	C(DirCon) -HTrCoef(Vap)
II-010-	J06	*	A009-	70	E-FaF(PLoss)
II-011-	J02	*	A010-	73	Flo-TPh
II-012	*	OSW-	A011-	66	Flo-TPh
II-013-	J07	*	A012-	68	Flo-StWat
II-014	*	*	L01-	70	Mix-(TPh-Flo)
II-015-	J07	*	A012-	70	Flo-TPh
II-016-	J02	*	A012-	73	Mix-(TPh-Flo)
II-017-	J08	*	A012-	74	Flo-StWat
II-018-	J02	*	A013-	71	Flo-TPh
II-019-	J09	*	A014-	70	HTr-TPhSys
II-020-	J10	*	A020-	75	Tu(Ho)
II-021-	J14	*	A016-	69	Desn(ThermosReB)
II-022-	J11	*	C01-	72	ReB/C

TABLE 6. CODE BREAKDOWN
Page 2

<u>Category- Reference Number-</u>	<u>Journal- Book-</u>	<u>OSW- ERDA- NSF/RANN-</u>	<u>Author- Company- Laboratory-</u>	<u>Year</u>	<u>Subject</u>
II-023-	J12	*	A017-	76	Flo-Str
II-024-	J04	*	A017-	76	Flo-(Ho-G/L)
II-025-	J13	*	A018-	72	E-FluFloReg
II-026	*	ERDA-	L02-	76	Flo-TPh(PDro)/HTrChar(VTu)
II-027	*	OSW-	C02-	66	Flo-TPh
II-028-	J14	*	A019-	73	HEx
III-029-	J10	*	A020-	72	FaF-Stab
III-030-	J04	*	A021-	68	Flo-W
III-031-	J15	*	A022-	71	FaF-Stab
III-032-	J15	*	A022-	71	FaF-L
III-033-	J04	*	A023-	74	WS-ThWF
III-034-	J04	*	A023-	75	WS-ThWF
III-035-	J10	*	A015-	75	Flo-TD
III-036-	J16	*	A024-	73	Flo-FluF(VSur)
III-037-	J17	*	A025-	75	E-ThF(FloProc)
III-038-	J04	*	A026-	69	FaF-WCh
III-039-	J10	*	A027-	70	Flo-LF
III-040-	J10	*	A027-	75	Flo-ThLF
III-041-	J02	*	A028-	73	Flo-C(VW1)
III-042-	J10	*	A028-	74	FaF-L
III-043-	J04	*	A029-	66	FaF-WM
III-044-	J16	*	A030-	73	CTuBa(PDro/ForDra)

TABLE 6. CODE BREAKDOWN
Page 3

<u>Category- Reference Number-</u>	<u>Journal- Book-</u>	<u>OSW- ERDA- NSF/RANN-</u>	<u>Author- Company- Laboratory-</u>	<u>Year</u>	<u>Subject</u>
III-045-	J02	*	A031-	72	Flo-W(ThLF)
III-046-	J15	*	A032-	74	MHTr-TurbTuFlo
III-047-	J15	*	A033-	71	Flo(RipF)-WetWlCol
III-048-	J15	*	A033-	72	WIncep-FaLF
III-049-	J02	*	A034-	71	Flo-ThLLa(Sur)
IV-050-	J01-	OSW-	A035-	70	HTrSur-VTuE
IV-051	*	OSW-	C03-	66	E-HorSprF
IV-052-	J15	*	A036-	73	FaF-L(TayDif)
IV-053-	J02	*	A037-	72	HTr(RibSur)
IV-054	*	*	L03-	67	HTr-WatPur
IV-055	*	OSW-	A038-	55	HTr-Rt (VaComprE)
IV-056-	J15	*	A039-	74	MTrCoef-LPh (FaF)
IV-057-	J02	*	A040-	75	MTr(Turb) -FFlo
IV-058-	J01-	OSW-	A041-	70	MatCond-EnhTu
IV-059-	J01-	OSW-	A042-	70	HTr-DesEq/FltSur
IV-060-	J02	*	A043-	74	HMTr-ForConv (FaF-LamExtrnBdry)
IV-061-	J18/23	*	A044-	71	HTr-ELF
IV-062-	J23	*	A044-	72	E-FaF
IV-063-	J02	*	A045-	75	Conv-Free (Lam/Turb)
IV-064-	J02	*	A046-	73	E-Rt (LLa-SolBod)
IV-065-	J01-	OSW-	A047-	70	HTrSur (Enh)VTuEProcP1
IV-066-	J15	*	A048-	74	HTr (TurbFaF)
IV-067-	J09	*	A014-	70	Flo-Cor (V/Incl)

TABLE 6. CODE BREAKDOWN
Page 4

<u>Category- Reference Number-</u>	<u>Journal- Book-</u>	<u>OSW- ERDA- NSF/RANN-</u>	<u>Author- Company- Laboratory-</u>	<u>Year</u>	<u>Subject</u>
IV-068-	J14	*	A015-	59	FaF-Sys (V)
IV-069-	B010	*	A015-	60	HTr/FluMech (FaFSys)
IV-070	*	OSW-	A015-	67	HTr-FaFSys
IV-071	*	OSW-	A015-	69	Tu(V) -EDistProc
IV-072-	B01	*	A015-	72	WG-LInterf
IV-073-	J18	*	A049-	73	E/C (CircGr-HoTu)
IV-074-	J01-	OSW-	A050-	70	Tu(Flt)
IV-075-	J20	*	A051-	75	HTrCoef-E (ThSeWatF-HoTu)
IV-076	*	OSW-	C04-	70	E-VTu (MultistFlDesProc)
IV-077-	J01-	OSW-	A052-	70	Tu(Enh) -HEX (HelFor)
IV-078-	J01-	OSW-	A053-	70	E-RisF (Db1Flt/SpIndTu)
IV-079-	J02	*	A054-	72	C-LamF (VSur)
IV-080-	J13	*	A024-	72	HTr-FaFlu (VSur)
IV-081-	J21	*	A055-	73	HTr-E (VTu)
IV-082-	B02	*	A056-	74	FaF(E) -EfSedCrys
IV-083-	J04	*	A057-	68	MTr (FaF)
IV-084-	J02	*	A058-	73	HTr (DrF)
IV-085-	J02	*	A059-	74	C (TurbStre-VSur
IV-086-	J02	*	A060-	72	HMTr (Lws) -TurbW1Flo
IV-087-	J22/18	*	A061-	71	HTr-Db1FltVTuE
IV-088-	J02	*	A062-	74	HTr/PDro (RoughSur) -EdVisMod
IV-089-	J13	*	A063-	74	HTr-FC (Clnts-VTu)

TABLE 6. CODE BREAKDOWN

Page 5

<u>Category- Reference Number-</u>	<u>Journal- Book-</u>	<u>OSW- ERDA- NSF/RANN -</u>	<u>Author- Company- Laboratory-</u>	<u>Year</u>	<u>Subject</u>
IV-090-	J23	*	A064-	59	E/C-IncrRt (ThF)
IV-091-	J19	*	A065-	76	HTr (FinTu-Intern)
IV-092-	J02	*	A066-	73	C (LamF) -VapDra (FlaSur)
IV-093-	J02	*	A067-	73	HTr (TurbFaF)
IV-094-	J16	*	A068-	73	HTr (Enh) -CTu
IV-095-	J02	*	A069-	73	HTrSur (Rough)
IV-096-	J15	*	A070-	73	FaF (Lam) -TayDif
IV-097-	J13	*	A071-	72	HTr-VapGen (FaF-VTu-FinSur)
IV-098-	J25	*	A072-	72	E-V (Lrg/Lng) Tu-SeWatDist
IV-099	*	OSW-	A073-	68	E-VTu (SephFlTu)
IV-100-	J01-	OSW-	A073-	70	HTr (Enh) -VorShrFlo
IV-101-	J02	*	A074-	73	HTr-ESurf (VFFlo)
IV-102-	J13	*	A075-	72	CF (Proc) -FloVap (VCylHTr)
IV-103-	J16	*	A076-	76	E (FltSur)
IV-104-	J14	*	A077-	62	HTr-FaF (VLngTu)E
IV-105-	J01-	OSW-	A078-	70	Tu-HTr (DesltP1)
IV-106-	J25	*	A079-	70	E/C (ThF) -FltTu)
IV-107-	J20	*	A079-	70	EEEnh (ThF) -FinSur
IV-108-	J25	*	A079-	73	HTrSur (Enh)
IV-109	*	*	A080-	61	Flo (LF) /E (SalWatDist)
IV-110-	J26	*	A081-	74	Tu (Enh) -HEX (Scal)
IV-111-	J02	*	A082-	76	HTrCoef (Interl) EWetF

TABLE 6. CODE BREAKDOWN
Page 6

Category- Reference Number-	Journal- Book-	OSW-ERDA- ERDA- NSF/RANN -	Author- Company- Laboratory-	Year	Subject
IV-112-	J02	*	A083-	72	HTr/FricCor-Tu(RepRibRough)
IV-113-	J02	*	A083-	72	HExDesn(RoughSur)
IV-114-	J01-	OSW-	A084-	70	C(St)-VRw(Ho-Corog/Pla-Tu)
V-115-	J30	*	A085-	75	HTr-FaF(VSur)
V-116-	J27	*	A086-	66	E(Refrig12)-HoTu(ConstW1HFlx)
V-117-	J27	*	A086-	76	E-Inf1Oil(Refrig12)
V-118-	J27	*	A087-	64	HTr/PDro(Refrig)-E(HoTu)
V-119-	J04	*	A088-	65	HTr-ERefrig(Flo-TPh)
V-120-	J13	*	A089-	76	HTrCoef(AmC)
V-121-	J13	*	A090-	72	HTr(B)-FaFRefrig
V-122-	J27	*	A091-	74	HTr/PDro(AmE)
VI-123	*	OSW-	C05-	65	DesnConcep(50MGD-DesP1)
VI-124	*	OSW-	C06-	59	E-VLngTu
VI-125	*	OSW-	C07-	66	DesnConcep(50MGD-DesP1)
VI-126	*	OSW-	C08-	73	E-VTu
VI-127	*	OSW-	A127-	71	Desn(MultiStgF1DistVes)
VI-128	*	OSW-	C09-	66	DesnConcep(150MGD-LngTuVDes1tP1)
VI-129-	J14	*	A093-	63	DesnHEx(FinTu)
VI-130-	J04	*	A094-	71	Dyn(MultpEfESys)
VI-131	*	OSW-	C10-	65	DesnConcep(50MGD-DesP1)
VI-132-	J28	*	A095-	70	Hydrod-WatSp(VE)
VI-133-	J01-	OSW-	A096-	70	Tu(Db1F1t)Bu

TABLE 6. CODE BREAKDOWN

Page 7

<u>Category- Reference Number-</u>	<u>Journal- Book-</u>	<u>OSW- ERDA- NSF/RANN-</u>	<u>Author- Company- Laboratory-</u>	<u>Year</u>	<u>Subject</u>
VI-134	*	OSW-	A097-	68	Mod(Anal)-F1Stg
VI-135-	J01-	OSW-	A098-	70	HTr(Enh)Sur-150MGD-MultiStgF1P1
VI-136-	J01-	OSW-	A099-	70	C(MultiTu)Test
VI-137	*	OSW-	C11-	61	ThFSeWatDist
VI-138-	J06	*	A100-	72	EP1-ApPhys
VI-139	*	OSW-	C12-	72	Tu(V)-DistDeslt
VI-140	*	OSW-	C13-	72	DesnConcep(DesltP1)
VI-141-	J01-	OSW-	A101-	70	HTr(Enh)Sur-VTuE
VI-142	*	OSW-	C10-	73	HEx(HoSprF)/E(VTu)
VI-143-	J03	*	A061-	73	FaF-VTuE
VI-144	*	OSW-	C14-	73	ContrMarFoul(SeWatDesP1)
VI-145-	J24	*	A102-	75	DesnHEx(OTEC)
VI-146	*	OSW-	A103-	70	TuSm(Fab)-LrgMultiStgF1EDesP1
VI-147-	J01-	OSW-	A103-	70	Tu(Enh)-Fab
VI-148-	J20	*	A104-	72	E(ModDev/Red/ExpEval)
VI-149	*	OSW-	L02-	68	DesnConcep(250MGD-VTuF1EDesP1)
VI-150	*	OSW-	L02-	70	E-VTu
VI-151	*	OSW-	C15-	65	DesnConcep(500MGD-DesP1)
VI-152	*	OSW-	C16-	63	Desn/P1Op-VLngTuE(HTr)
VI-153-	J06	*	A105-	69	Desn(E-NonSca)
VI-154	*	OSW-	A106-	67	E(Lrg)P1-EqCompo
VI-155	*	OSW-	C17-	67	DesnConcep(50MGD-DesP1)

TABLE 6. CODE BREAKDOWN

Page 8

Category- Reference Number-	Journal- Book-	OSW- ERDA- NSF/RANN-	Author- Company- Laboratory-	Year	Subject
VII-156	*	*	L04-	76	OTEC(P1Ships)-Marit/Constr
VII-157	*	NSF/RANN-	A107-	75	HEX-OTEC
VII-158	*	ERDA-	A108-	75	OTEC-OpCycPowP1
VII-159	*	ERDA-	A047-	75	HEX-OTEC
VII-160	*	ERDA-	A047-	77	HEX-OTEC
VII-161	*	ERDA-	A109-	75	HEXMicroS1-OTEC
VII-162	*	ERDA-	A110-	75	OTEC-Proceed(3rd/4thWorks)
VII-163	*	ERDA-	A111-	75	Foul/Coro(SSPowP1)
VII-164-	J31	*	A112-	54	CF-Sur(Corog/SurTens)
VII-165	*	ERDA-	A113-	77	OTEC-Proceed(3rd/4thWorks)
VII-166	*	ERDA-	A114-	75	Flu(Work)Mix-OTEC
VII-167	*	ERDA-	A115-	75	HTrSur(Biofoul-OTEC)
VII-168	*	ERDA-	C18-	76	OTEC-LMSC(HEX/Desn/ProdStudy)
VII-169	*	ERDA-	C18-	77	OTEC-LMSC(TestFacStudy)
VII-170	*	NSF/RANN-	A116-	75	FluMotn(CIntk-400MWOTECP1)
VII-171	*	NSF/RANN-	A117-	74	FluSys(RankCyc)-OTEC
VII-172	*	NSF/RANN-	A102-	74	HEX-OTEC
VII-173	*	ERDA-	A118-	77	HTr-OTEC
VII-174	*	ERDA-	L04-	75	Flo-TPh-HEX(OTEC)
VII-175	*	ERDA-	A119-	75	HTr(Enh)/Mat-OTEC(HEX)
VII-176	*	NSF/RANN-	A119-	75	Flo-Flu(HEXConcep)
VII-177	*	ERDA-	A119-	77	HTrCoef(E/C)Am-Tu(VSm/AxFlt)

TABLE 6. CODE BREAKDOWN PAGE 9

<u>Category- Reference Number-</u>	<u>Journal- Book-</u>	<u>OSW- ERDA- NSF/RANN-</u>	<u>Author- Company- Laboratory-</u>	<u>Year</u>	<u>Subject</u>
VII-178	*	ERDA-	A120-	75	HTrSur(Ext)Nvap(Low Δ T-OTEC)
VII-179	*	ERDA-	A120-	77	HTr(Enh)-E(OTEC)
VII-180-	J32	*	A121-	63	HTr(FinTu)/Compt(HExTuBa)
VII-181	*	ERDA-	A122-	75	HExPlas-OTEC
VII-182	*	NSF/RANN-	A123-	74	C-DischPlu(OTEC)
VII-183	*	ERDA-	C19-	76	TRW(TestFacReqStudy)
VII-184	*	ERDA-	A124-	75	Foam-SSPow
VIII-185-	B02	*	A125-	74	HEx(Desn/Thry)
VIII-186-	B03	*	A126-	76	HTr/FluMech-74/76Proceed
VIII-187	*	NSF/RANN-	L05-	74	HTr(Conv)Worksh
VIII-188-	B04	*	A127-	74	HTr/FluMech-74/76Proceed
VIII-189	*	OSW-	A128-	75	DesltP1(InvRep5)
VIII-190	*	OSW-	C11-	65	DesnConcep(50MGD-DesP1)-GE
VIII-191-	B05	*	A112-	64	HTr(DesnConstr-Op-Mgt)
VIII-192-	B06	*	A129-	69	HMTr-Prog
VIII-193	*	OSW-	L02-	69/71	Tu(Enh)-SeWatDistP1
VIII-194	*	OSW-	A130-	71	E-VLngTu
VIII-195-	B01	*	A131-	72	HMTr-Prog
VIII-196	*	OSW-	C12-	72	Dist/Deslt(VTu)
VIII-197-	B07	*	A132-	76	HTr(Adv)
VIII-198	*	OSW-	L02-	71	DistProc(SalWatConvs)-Tech
VIII-199	*	*	L02/CO1-	67	Des(Nuc)-InfoCtr
VIII-200-	B08	*	A133-	76	ChemEngr(UnOp)
VIII-201-	B09	*	A134-	54	HTransm

TABLE 6. CODE BREAKDOWN PAGE 10

<u>Category- Reference Number-</u>	<u>Journal- Book-</u>	<u>OSW- ERDA- NSF/RANN-</u>	<u>Author- Company- Laboratory-</u>	<u>Year</u>	<u>Subject</u>
VIII-202	*	*	L02-	66	Chem/ApInd-ProcTech
VIII-203	*	OSW-	C20-	72	DesltPl(Lrg)-MatBeh

TABLE 7. SUBJECT INDEX PAGE 1

<u>Subject</u>	<u>Category- Reference Number</u>	<u>Abbreviated Form</u>
Boiling-Nucleate	I-004,005,006, 007,008	B-N
Chemical/Applied Industries-Process Techniques	VIII-202	Chem/ApInd-ProcTech
Chemical Engineering (Unit Operation)	VIII-200	ChemEngr(UnOp)
Condensation(DirectContact)-Heat Transfer Coefficients(Vapor)	I-009	C(DirCon)-HTrCoef(Vap)
Condenser-Discharge Plume(OTEC)	VII-182	C-DischPlu(OTEC)
Condensation-Dropwise	I-001,002,003	C-D
Condensation Film(Process)- Flow Vapor (Vertical Cylinder Heat Transfer)	IV-102	CF(Proc)-FloVap(VCylHTr)
Condenser Film - Surface(Corroged/ Surface Tension)	VII-164	CF-Sur(Corog/SurTens)
Condensation - Laminar Film(Vertical Surface)	IV-079	C-LamF(VSur)
Condensation(Laminar Film) - Vapor Drag (Flat Surface)	IV-092	C(LamF)-VapDra(FlatSur)
Condensation (MultiTube) Test	VI-136	C(MultiTu)Test
Condensation(Steam)-Vertical Rows (Horizontal- Corroged/Plain-Tubes)	IV-114	C(St)-VRw(Ho-Corog/Pla-Tu)
Condenser Tube Bank(Pressure Drop/Form Drag)	III-044	CTuBa(PDro/ForDra)
Condensation(Turbulent Stream-Vertical Surface)	IV-085	C(TurbStre-VSur)
Controlling Marine Fouling-(Sea Water Desalinization Plants)	VI-144	ContrMarFoul(SeWatDesPl)
Convection-Free(Laminar/Turbulent)	IV-063	Conv-Free(Lam/Turb)
Desalinization(Nuclear)-Information Center	VIII-199	Des(Nuc)-InfoCtr
Desalting Plant(Inventory Report 5)	VIII-189	DesltPl(InvRep5)
Desalting Plant (Large) - Materials Behavior	VIII-203	DesltPl(Lrg)-MatBeh

TABLE 7. SUBJECT INDEX PAGE 2

<u>Subject</u>	<u>Category- Reference Number</u>	<u>Abbreviated Form</u>
Design Conceptual (50 MGD - Desalinization Plant)	VI-123,125, 131,155	DesnConcep(50MGD-DesP1)
Design Conceptual (50 MGD - Desalinization Plant) - General Electric	VIII-190	DesnConcep(50MGD-DesP1)-GE
Design Conceptual (500 MGD - Desalinization Plant)	VI-151	DesnConcep(500MGD-DesP1)
Design Conceptual (150 MGD - Long Tube Vertical Desalting Plant)	VI-128	DesnConcep(150MGD-LngTuVDesltP1)
Design Conceptual (250 MGD - Vertical Tube Flash Evaporator Desalinization Plant)	VI-149	DesnConcep(250MGD-VTuFlEDesP1)
Design Conceptual (Desalting Plant)	VI-140	DesnConcep(DesltP1)
Design (Evaporators - Non Scaling)	VI-153	Desn(E-NonSca)
Design Heat Exchangers (OTEC)	VI-145	DesnHEx(OTEC)
Design Heat Exchangers (Finned Tubes)	VI-129	DesnHEx(FinTu)
Design (Multistage Flash Distillation Vessel)	VI-127	Desn(MultiStgFlDistVes)
Distillation/Desalting (Vertical Tubes)	VIII-196	Dist/Deslt(VTu)
Distillation Processes (Saline Water Conversion) - Technology	VIII-198	DistProc(SalWatConvs)-Tech
Dynamics (Multiple Effect Evaporator System)	VI-130	Dyn(MultpEfESys)
Design/Plant Operation - Vertical Long Tube Evaporators (Heat Transfer)	VI-152	Desn/P10p-VLngTuE(HTr)
Design (Thermosiphon Reboiler)	II-021	Desn(ThermosReB)
Evaporation/Condensation (Circumferential Grooves - Horizontal Tubes)	IV-073	E/C(CircGr-HoTu)
Evaporation/Condensation - Increasing Rates (Thin Film)	IV-090	E/C-IncrRt(ThF)
Evaporation/Condensation (Thin Film) - (Fluted Tubes)	IV-106	E/C(ThF)-(FltTu)
Evaporation Enhanced (Thin Film) - Finned Surfaces	IV-107	EEnh(ThF)-FinSur

TABLE 7. SUBJECT INDEX PAGE 3

<u>Subject</u>	<u>Category- Reference Number</u>	<u>Abbreviated Form</u>
Evaporators - Falling Film	IV-062	E-FaF
Evaporators - Falling Film (Pressure Loss)	II-010	E-FaF(PLoss)
Evaporators - Fluid Flow Regimes	II-025	E-FluFloReg
Evaporation (Fluted Surfaces)	IV-103	E(FltSur)
Evaporators - Horizontal Spray Film	IV-051	E-HorSprF
Evaporator - Influence Oil (Refrigerant 12)	V-117	E-Inf1Oil(Refrig12)
Evaporator (Large) Plant - Equipment Components	VI-154	E(Lrg)Pl-EqCompo
Evaporator (Model Development/Reduction/ Experimental Evaluation)	VI-148	E(ModDev/Red/ExpEval)
Evaporator Plant - Applied Physics	VI-138	EP1-ApPhys
Evaporation-Rate (Liquid Layer - Solid Body)	IV-064	E-Rt(LLa-SolBod)
Evaporator (Refrigerant 12) - Horizontal Tube (Constant Wall Heat Flux)	V-116	E(Refrig12)-HoTu(ConstWlHFlx)
Evaporator - Rising Film (Double Fluted/ Spirally Indented Tube)	IV-078	E-RisF(DblFlt/SpIndTu)
Evaporator - Thin Film (Flow Processes)	III-037	E-ThF(FloProc)
Evaporator - Vertical Tube	VI-126,150	E-VTu
Evaporator - Vertical Long Tube	VI-124,VIII-194	E-VLngTu
Evaporator - Vertical (Large/Long) Tube - Sea Water Distillation)	IV-098	E-V(Lrg/Lng)Tu-SeWatDist
Evaporator - Vertical Tube (Multistage Flash Desalinization Process)	IV-076	E-VTu(MultistgFlDesProc)
Evaporator - Vertical Tube (Sephton Flash Tube)	IV-099	E-VTu(SephFlTu)
Falling Film (Evaporator) - Effect Seed Crystal	IV-082	FaF(E)-EfSedCrys
Falling Film (Laminar) - Taylor Diffusion	IV-096	FaF(Lam)-TayDif
Falling Film - Liquid	III-032, 042	FaF-L

TABLE 7. SUBJECT INDEX PAGE 4

<u>Subject</u>	<u>Category- Reference Number</u>	<u>Abbreviated Form</u>
Falling Film - Liquid (Taylor Diffusion)	IV-052	FaF-L(TayDif)
Falling Film - Stability	III-029,031	FaF-Stab
Falling Film - System (Vertical)	IV-068	FaF-Sys (V)
Falling Film - Wave Characteristics	III-038	FaF-WCh
Falling Film - Wave Motion	III-043	FaF-WM
Falling Film - Vertical Tube Evaporator	VI-143	FaF-VTuE
Flow-Condensate (Vertical Walls)	III-041	Flo-C(VW1)
Flow-Correlations (Vertical/Inclined)	IV-067	Flo-Cor(V/Incl)
Flow (Rippled Film) - Wetted Wall Columns	III-047	Flo(RipF)-WetW1Col
Flowing-Fluid Film (Vertical Surface)	III-036	Flo-FluF(VSur)
Flow-Fluid (Heat Exchanger Concepts)	VII-176	Flo-Flu(HExConcep)
Flow-(Horizontal-Gas/Liquid)	II-024	Flo-(Ho-G/L)
Flow- Liquid Films	III-039	Flo-LF
Flow (Liquid Film)/Evaporation (Saline Water Distillation)	IV-109	Flo(LF)/E(SalWatDist)
Flow-Stratified	II-023	Flo-Str
Flow-Steam Water	II-013,017	Flo-StWat
Flow-Two Dimensional	III-035	Flo-TD
Flo-Thin Liquid Film	III-040	Flo-ThLF
Flow-Thin Liquid Layer (Surface)	III-049	Flo-ThLLa(Sur)
Flow-Two Phase	II-011,012,015, 018,027	Flo-TPh
Flow-Two Phase - Heat Exchangers (OTEC)	VII-174	Flo-TPh-HEX(OTEC)
Flow-Two Phase (Pressure Drop)/Heat Transfer Characteristics (Vertical Tube)	II-026	Flo-TPh(PDro)/HTrChar(VTu)

TABLE 7. SUBJECT INDEX PAGE 5

<u>Subject</u>	<u>Category- Reference Number</u>	<u>Abbreviated Form</u>
Flow-Wave	III-030	Flo-W
Flow-Wave(Thin Liquid Film)	III-045	Flo-W(ThLF)
Fluid Motion (Condenser Intake - 400 MW OTEC Plant)	VII-170	FluMotn(CIntk-400MWOTECP1)
Fluid (Working) Mixtures - OTEC	VII-166	Flu(Work)Mix-OTEC
Fluid System (Rankine Cycle) - OTEC	VII-171	FluSys (RankCyc)-OTEC
Foam-Solar Sea Power	VII-184	Foam-SSPow
Fouling/Corrosion (Solar Sea Power Plants)	VII-163	Foul/Coro(SSPowP1)
Heat Exchangers	II-028	HEX
Heat Exchangers - OTEC	VII-157, 159, 160, 172	HEX-OTEC
Heat Exchanger Design (Rough Surface)	IV-113	HEXDesn (RoughSur)
Heat Exchanger (Design/Theory)	VIII-185	HEX(Desn/Thry)
Heat Exchanger (Horizontal Spray Film)/ Evaporator (Vertical Tube)	VI-142	HEX(HoSprF)/E(VTu)
Heat Exchanger Microbial Slime - OTEC	VII-161	HEXMicroSl-OTEC
Heat Exchanger Plastic - OTEC	VII-181	HEXPlas-OTEC
Heat Mass Transfer - Forced Convection (Falling Film - Laminar External Boundary)	IV-060	HMTr-ForConv (FaF-LamExtrnBdry)
Heat Mass Transfer (Laws) - Turbulent Wall Flow	IV-086	HMTr(Lws)-TurbWIFlo
Heat Mass Transfer - Progress	VIII-192, 195	HMTr-Prog
Heat Transfer (Advances)	VIII-197	HTr(Adv)
Heat Transfer (Boiling) - Falling Film Refrigerant	V-121	HTr(B)-FaFRefrig
Heat Transfer Coefficient (Ammonia Condenser)	V-120	HTrCoef(AmC)
Heat Transfer Coefficients - Evaporation (Thin Sea Water Films - Horizontal Tube)	IV-075	HTrCoef-E(ThSeWatF-HoTu)

TABLE 7. SUBJECT INDEX PAGE 6

<u>Subject</u>	<u>Category- Reference Number</u>	<u>Abbreviated Form</u>
Heat Transfer Coefficients (Evaporation/Condensation) Ammonia-Tubes (Vertical Smooth/Axial Flutes)	VII-177	HTrCoef(E/C)Am-Tu(VSm/AxFlt)
Heat Transfer Coefficient (Interline) - Evaporating Wetting Film	IV-111	HTrCoef(Interl)-EWetF
Heat Transfer (Convective)Workshop	VIII-187	HTr(Conv)Worksh
Heat Transfer - Desalinization Equipment/Fluted Surface	IV-059	HTr-DesEq/FltSur
Heat Transfer (Design Construction-Operation-Management)	VIII-191	HTr(DesnConstr-Op-Mgt)
Heat Transfer - Double Fluted Vertical Tube Evaporator	IV-087	HTr-Db1F1tVTuE
Heat Transfer (Draining Film)	IV-084	HTr(DrF)
Heat Transfer (Enhanced) - Condenser Tubing	IV-094	HTr(Enh)-CTu
Heat Transfer Enhancement - Evaporators (OTEC)	VII-179	HTr(Enh)-E(OTEC)
Heat Transfer (Enhanced)/Materials - OTEC (Heat Exchangers)	VII-175	HTr(Enh)/Mat-OTEC(HEx)
Heat Transfer (Enhancement) - Vortex Shear Flow	IV-100	HTr(Enh)-VorShrFlo
Heat Transfer (Enhanced) Surface - Vertical Tube Evaporator	VI-141	HTr(Enh)Sur-VTuE
Heat Transfer (Enhanced) Surface - 150 MGD - Multistage Flash Plant	VI-135	HTr(Enh)Sur-150MGD-MultiStgF1P1
Heat Transfer - Evaporating Liquid Film	IV-061	HTrELF
Heat Transfer - Evaporating Refrigerants (Flow-Two Phase)	V-119	HTr-ERefrig(Flo-TPH)
Heat Transfer - Evaporating Surfactant (Vertical Film Flow)	IV-101	HTr-ESurf(VFFlo)
Heat Transfer - Evaporator (Vertical Tube)	IV-081,VI-152	HTr-E(VTu)
Heat Transfer - Falling Film System	IV-070	HTr-FaFSys
Heat Transfer - Falling Film (Vertical Long Tube) Evaporator	IV-104	HTr-FaF(VLngTu)E
Heat Transfer - Falling Film (Vertical Surface)	IV-115	HTr-FaF(VSur)
Heat Transfer - Falling Fluid (Vertical Surface)	IV-080	HTr-FaFlu(VSur)

TABLE 7. SUBJECT INDEX PAGE 7

<u>Subject</u>	<u>Category- Reference Number</u>	<u>Abbreviated Form</u>
Heat Transfer - Film Condensation (Coolants - Vertical Tubes)	IV-089	HTr-FC(Clnts-VTu)
Heat Transfer/Fluid Mechanics (Falling Film System)	IV-069	HTr/FluMech(FaFSys)
Heat Transfer/Fluid Mechanics - 74/76 Proceedings	VIII-188,186	HTr/FluMech-74/76Proceed
Heat Transfer (Finned Tubes - Internally)	IV-091	HTr(FinTu-Intern)
Heat Transfer (Finned Tubes)/Computation (Heat Exchanger Tube Bank)	VII-180	HTr(FinTu)/Compt(HExTuBa)
Heat Transfer/Friction Correlations - Tube (Repeated Rib Roughness)	IV-112	HTr/FricCor-Tu(RepRibRough)
Heat Transfer - OTEC	VII-173	HTr-OTEC
Heat Transfer/Pressure Drop(Ammonia Evaporator)	V-122	HTr/PDro(AmE)
Heat Transfer/Pressure Drop (Rough Surface) - Eddy Viscosity Model	IV-088	HTr/PDro(RoughSur)-EdVisMod
Heat Transfer/Pressure Drop (Refrigerants) - Evaporating (Horizontal Tubes)	V-118	HTr/PDro(Refrig)-E(HoTu)
Heat Transfer (Ribbed Surface)	IV-053	HTr(RibSur)
Heat Transfer - Rate (Vapor Compression Evaporators)	IV-055	HTr-Rt(VaComprE)
Heat Transfer Surface (Biofouling - OTEC)	VII-167	HTrSur(Biofoul-OTEC)
Heat Transfer Surface (Enhancement)	IV-108	HTrSur(Enh)
Heat Transfer Surface - Vertical Tube Evaporator	IV-050	HTrSur-VTuE
Heat Transfer Surface (Enhanced) Vertical Tube Evaporator Process Plant	IV-065	HTrSur(Enh)VTuEProcP1
Heat Transfer Surface (Extended)/Nucleating Vaporization (Low ΔT - OTEC)	VII-178	HTrSur(Ext)Nvap(Low ΔT -OTEC)
Heat Transfer Surface (Rough)	IV-095	HTrSur(Rough)
Heat Transfer (Turbulent Falling Film)	IV-066,093	HTr(TurbFaF)
Heat Transfer - Two Phase System	II-019	HTr-TPhSys

TABLE 7. SUBJECT INDEX PAGE 8

<u>Subject</u>	<u>Category- Reference Number</u>	<u>Abbreviated Form</u>
Heat Transfer - Vapor Generation (Falling Film - Vertical Tube - Finned Surface)	IV-097	HTr-VapGen (FaF-VTu-FinSur)
Heat Transfer - Water Purification	IV-054	HTr-WatPur
Heat Transmission	VIII-201	HTransm
Hydrodynamics - Water Space (Vertical Evaporators)	VI-132	Hydrod-WatSp (VE)
Mass Heat Transfer-Turbulent Tube Flow	III-046	MHTr-TurbTuFlo
Mass Transfer (Falling Film)	IV-083	MTr (FaF)
Mass Transfer Coefficient - Liquid Phase (Falling Film)	IV-056	MTrCoef-LPh (FaF)
Mass Transfer (Turbulent) - Film Flow	IV-057	MTr (Turb) -FFlo
Material Conductivity - Enhanced Tubes	IV-058	MatCond-EnhTu
Mixtures - (Two Phase-Flow)	II-014,016	Mix- (TP-Flo)
Model (Analytical)-Flash Stage	VI-134	Mod (Anal) -F1Stg
OTEC-Lockheed Missiles and Space Company (Heat Exchanger/Design/Producibility Study)	VII-168	OTEC-LMSC (HEX/Desn/ProdStudy)
OTEC-Lockheed Missiles and Space Company (Test Facility Study)	VII-169	OTEC-LMSC (TestFacStudy)
OTEC - Open Cycle Power Plant	VII-158	OTEC-OpCycPowP1
OTEC (Plant Ships) - Maritime/Construction	VII-156	OTEC (P1Ships) -Marit/Constr
OTEC - Proceedings (3rd/4th Workshops)	VII-162, 165	OTEC-Proceed (3rd/4thWorks)
Reboiler/Condenser	II-022	ReB/C
Thin Film Sea Water Distillation	VI-137	ThFSeWatDist
TRW (Test Facility Requirements) Study	VII-183	TRW (TestFacReqStudy)
Tube (Double Fluted) Bundle	VI-133	Tu (DblFlt) Bu
Tube (Enhanced) - Fabrication	VI-147	Tu (Enh) -Fab
Tube (Enhanced) - Heat Exchanger (Helically Formed)	IV-077	Tu (Enh) -HEX (HelFor)

TABLE 7. SUBJECT INDEX PAGE 9

<u>Subject</u>	<u>Category- Reference Number</u>	<u>Abbreviated Form</u>
Tube (Enhanced) - Heat Exchangers (Scaling)	IV-110	Tu(Enh)-HEX(Scal)
Tube (Enhanced) - Sea Water Distillation Plant	VIII-193	Tu(Enh)-SeWatDistPl
Tube (Fluted)	IV-074	Tu(Flt)
Tubes - Heat Transfer (Desalting Plants)	IV-105	Tu-HTr(DesltPl)
Tube (Horizontal)	II-020	Tu(Ho)
Tubes Smooth (Fabrication) - Large Multistage Flash Evaporator Desalinization Plant	VI-146	TuSm(Fab)-LrgMultiStgFlEDesPl
Tube (Vertical) - Evaporator Distillation Process	IV-071	Tu(V)-EDistProc
Tube (Vertical) - Distillation Desalting	VI-139	Tu(V)-DistDeslt
Wavy Gas-Liquid Interface	IV-072	WG-LInterf
Wave Inception - Falling Liquid Film	III-048	WIncep-FaLF
Wave Structure - Thin Wavy Film	III-033,034	WS-ThWF

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