

APPENDIX C-1. DATA REQUEST FORMS - MANUFACTURING COSTS AND ENERGY CHARACTERISTICS FOR ELECTRIC AND GAS-FIRED STORAGE WATER HEATERS

TABLE OF CONTENTS

TABLES

Table C-1.1	Manufacturing Cost Data Request - Electric Water Heaters	C-1.2
Table C-1.2	Energy Characteristics - Electric Water Heaters	C-1.3
Table C-1.3	Manufacturing Cost Data Request - Gas-Fired Water Heaters	C-1.4
Table C-1.4	Energy Characteristics - Gas-Fired Water Heaters	C-1.5

**APPENDIX C-1. DATA REQUEST FORMS - MANUFACTURING
COSTS AND ENERGY CHARACTERISTICS FOR ELECTRIC AND
GAS-FIRED STORAGE WATER HEATERS**

This Appendix reproduces the data request forms used to gather manufacturer cost and energy characteristics data for residential electric and gas-fired water heaters. These forms were developed by Arthur D. Little Inc. and were provided to water heater manufacturers by the U.S. Department of Energy on November 17, 1997.

Table C-1.1 Manufacturing Cost Data Request - Electric Water Heaters

Appliance Type: Appliance Class (anticipated): Rated Volume		Water Heater Electric 50 gallons Yearly Production Volume (a) =											
DOE Design Options		Variable Costs				Total Variable Costs (e) (\$ per Unit) [4]	Cost Uncertainty Range		Conversion Costs (Fixed) Total (millions of dollars)		Total Fixed Costs (j) (millions) [9]	Cost Uncertainty Range	
		Costs per Unit (a)					Variable Costs (+/- percentage) (f)		Capital Costs(g),(h) [7]	Product (i) Design Costs [8]		Fixed Costs (+/- percentage) (k)	
		Material (b) [1]	Labor (c) [2]	Transportation [3]	Overhead (d) [3]		Maximum [5]	Minimum [6]				Maximum [10]	Minimum [11]
1	Baseline												
2	Heat Traps												
3	Increased Insulation (1st level)												
4	Increased Insulation (2nd level)												
5	Plastic Tank												
6	Insulated Tank Bottom												

Table C-1.2 Energy Characteristics - Electric Water Heaters

Appliance Type: Water Heater Electric										
Appliance Class (anticipated): 50 gallons										
Rated Volume: 50 gallons										
DOE Design Options	Energy Data (when applied directly to Baseline) (l)					Uncertainty Range		Energy Data	Comments	Estimated
	EF	RE	UA	On-Cycle	Off-Cycle	Total EF				
	(m)	(η)r (n)	(o)	Elec (p) <i>W</i>	Elec (q) <i>W</i>	(+/- percentage) (r)				
	[12]	[13]	[14]	[15]	[16]	Maximum [17]	Minimum [18]	[19]	[20]	[21]
1	Baseline									
2	Heat Traps									
3	Increased Insulation (1st level)									
4	Increased Insulation (2nd level)									
5	Plastic Tank									

Table C-1.3 Manufacturing Cost Data Request - Gas-Fired Water Heaters

Appliance Type:		Water Heater											Yearly Production Volume (a) =								
Appliance Class (anticipated):		Gas-fired																			
Rated Volume:		40 gallons																			
DOE Design Options	Variable Costs				Total	Cost Uncertainty Range		Conversion Costs (Fixed)		Total	Cost Uncertainty Range										
	Costs per Unit (a)				Variable Costs (e) (\$ per Unit) [4]	Variable Costs (+/- percentage) (f)		Total (millions of dollars)		Fixed Costs (j) (millions) [9]	Fixed Costs (+/- percentage) (k)										
	Material (b) [1]	Labor (c) [2]	Transportation	Overhead (d) [3]		Maximum [5]	Minimum [6]	Capital Costs(g),(h) [7]	Product (i) Design Costs [8]		Maximum [10]	Minimum [11]									
													Costs (e)	Maximum	Minimum	Capital Costs(g),(h)	Product (i) Design Costs	Fixed Costs (j)	Maximum	Minimum	
1	Baseline																				
2	Heat Traps																				
3	Increased Insulation (1st level)																				
4	Increased Insulation (2nd level)																				
5	Plastic Tank																				
6	Improved Flue Baffle																				
7	Multiple Flues																				
8	Improved Combustion Chamber																				
9	Submerged Combustion Chamber																				
10	Flue Damper (electro-mechanical)																				
11	Side Arm Heater																				
12	Two Phase Thermosiphon																				
13	IID																				
14	Direct Vent																				
15	Induced Draft																				
16	Induced Draft w/ Flue Gas Dilution																				

Table C-1.4 Energy Characteristics - Gas-Fired Water Heaters

Appliance Type:		Water Heater								
Appliance Class (anticipated):		Gas-fired								
Rated Volume:		40 gallons								
DOE Design Options	Energy Data (when applied directly to Baseline) (l)					Uncertainty Range		Energy Data Source (s)	Comments Notes	Estimated Increase in Retail Price
	EF	RE	UA	On-Cycle	Off-Cycle	Total EF				
	(m)	(η_r) (n)	(o)	Elec (p) W	Elec (q) W	(+/- percentage) (r)				
	[12]	[13]	[14]	[15]	[16]	Maximum [17]	Minimum [18]	[19]	[20]	[21]
1	Baseline									
2	Heat Traps									
3	Increased Insulation (1st level)									
4	Increased Insulation (2nd level)									
5	Plastic Tank									
6	Improved Flue Baffle									
7	Multiple Flues									
8	Improved Combustion Chamber									
9	Submerged Combustion Chamber									
10	Flue Damper (electro-mechanical)									
11	Side Arm Heater									
12	Two Phase Thermosiphon									
13	IID									
14	Direct Vent									
15	Induced Draft									
16	Induced Draft w/ Flue Gas Dilution									