PUBLIC UTILITIES COMMISSION

505 VAN NESS AVENUE SAN FRANCISCO, CA 94102-3298



April 12, 2017

Advice Letter 5084-A

Ronald van der Leeden Director, Regulatory Affairs Southern California Gas 555 W. Fifth Street, GT14D6 Los Angeles, CA 90013-1011

Subject: Supplement – Notification of Updated Energy Savings Assistance (ESA) Program Thermostatic Tub Spout Measure Savings

Dear Mr. van der Leeden:

Advice Letter 5084-A is effective as of January 27, 2017.

Sincerely,

Edward Randolph

Director, Energy Division

Edward Randoft

Ronald van der Leeden Director Regulatory Affairs



555 W. Fifth Street, GT14D6 Los Angeles, CA 90013-1011 Tel: 213.244.5141 Fax: 213.244.4957

Rvanderleeden @semprautilities.com

March 9, 2017

Advice No. 5084-A

(U 904 G)

Public Utilities Commission of the State of California

<u>Subject:</u> Supplement - Notification of Updated Energy Savings Assistance (ESA) Program Thermostatic Tub Spout Measure Savings

Purpose

Southern California Gas Company (SoCalGas) hereby notifies the California Public Utilities Commission (Commission) of updated savings relating to the Thermostatic Tub Spout (TTS) Measure in the ESA Program.

This supplemental filing replaces in its entirety Advice No. 5084, Notification of Updated ESA TTS Measure Savings, filed on January 27, 2017. The purpose of this Advice Letter is to provide information on the cost-effectiveness of the TTS Measure.

Discussion

On November 18, 2014, SoCalGas filed Application (A.) 14-11-011 seeking approval of the TTS Measure in the ESA Program in efforts to increase both energy and water savings. On November 21, 2016, the Commission issued Decision (D.) 16-11-022 which approved the "deployment of thermostatic tub spouts in the ESA Program as they become commercially available in 2016 and are consistent with the projected savings in SoCalGas' application."

In A.14-11-011, SoCalGas had indicated that the TTS Measure was expected to achieve 2,135,197 first year therm savings each for 2016 and 2017.² On April 25, 2016, SoCalGas submitted Workpaper SWWH001v00, *Auto-Diverting Tub Spout with Thermostatic Shut-Off Valve*, in the Energy Efficiency Rolling Portfolio Rulemaking (R.13-11-005) in support of SoCalGas' Residential Deemed Energy Efficiency

¹ See D.16-11-022 at pp. 145-146; and Conclusion of Law 47.

² Prepared Direct Testimony of Mark Aguirre and Hugh Yao November 18, 2014, at p. 107 and Exhibit 2: ESA Program Measures & Associated First Year Therm Savings.

programs. The Workpaper, included as Attachment A, provided new information regarding the total savings the TTS Measure is expected to achieve. In Table 1 below, and as further described in the Workpaper, SoCalGas provides new energy savings findings per unit for the TTS installation scenarios under SoCalGas' ESA Program.³

Table 1: ESA Thermostatic Tub Spout Savings Per Unit

Climate Zone 4 4	Housing Type SF MF	Tub Spout Therm Savings Per installation 8.63 9.63
4	MH	8.63
5	SF	9.30
5	MF	10.38
5	MH	9.30
6	SF	8.21
6	MF	9.17
6	MH	8.21
8	SF	7.84
8	MF	8.76
8	MH	7.84
9	SF	7.83
9	MF	8.75
9	MH	7.83
10	SF	7.78
10	MF	8.70
10	MH	7.78
13	SF	7.83
13	MF	8.77
13	MH	7.83
14	SF	8.09
14	MF	9.07
14	MH	8.09
15	SF	5.76
15	MF	6.49
15	MH	5.76

³ See Workpaper, Attachment A, p. 22.

16	SF	10.09
16	MF	11.28
16	MH	10.09

In total, SoCalGas projects installation of 384,959 tub spouts saving a total of 3,006,364 first-year therms over 2017-2020, based on the treated unit goals adopted in D.16-11-022 as shown in Table 2 below.

Table 2: Thermostatic Tub Spout Projected Energy Savings 2017-2020

	2017	2018	2019	2020	TOTAL
Treated Unit Goal	110,000	115,500	121,275	127,339	474,114
Tub Spout					
Installations	89,315	93,781	98,470	103,393	384,959
Projected					
Expenditures	\$9,187,834	\$9,859,465	\$10,582,262	\$11,353,625	\$40,983,186
First Year Therm					
Savings	709,689	745,176	782,434	769,064	3,006,364
Lifecycle Therm					
Savings	7,096,890	7,451,760	7,824,340	7,690,640	30,063,640

As estimated in the Workpaper⁴, the TTS provides less energy savings than projected in A.14-11-011. Nevertheless, the resulting cost effectiveness calculations remain consistent with SoCalGas' inclusion of TTS in its ESA portfolio. Specifically, with the exception of climate zone 15, TTS has a cost effectiveness above 1.0 as measured by the ESACET test for all climate zones and housing types. For the Resource TRC test, TTS is above the portfolio average 0.36 for all climate zones and housing types. Please see Attachment B for complete ESACET and Resource TRC calculation results.⁵ Incorporating the TTS in the SoCalGas ESA portfolio, as opposed to leaving it out, raises both the total Resource TRC and the total ESACET result as shown in Table 3.

Table 3: SoCalGas Cost Effectiveness 2017 Portfolio Comparison

Errata Filing			Using New Tub Spout Savings		Taking Tub spouts out of portfolio (Quantity = 0)	
ESACET	Resource TRC	ESACET	Resource TRC	ESACET	Resource TRC	
0.90	0.58	0.79	0.41	0.77	0.36	

⁴ The Workpaper contains unit installed cost estimates relevant to another program; these do not apply to ESA.

⁵ Advice Letter to be filed March 31, 2017.

In order to demonstrate the impact on the portfolio of the TTS and the change in that measure's savings, cost effectiveness results provided in this table are presented based on the parameters used for year 2017 of SoCalGas' Errata Application Filing. Between the "Errata Filing" and "Using New Tub Spout Savings" scenarios shown, only the TTS savings are varied demonstrating the impact of that adjustment on the portfolio. In the "Taking Tub Spouts Out" scenario, the TTS is removed demonstrating that the measure remains a net benefit to portfolio cost effectiveness.

The TTS Measure remains an important part of SoCalGas' ESA Program measure portfolio and one of the most substantial contributors to therm savings. The energy savings provided in the Workpaper, while lower than the figures presented in SoCalGas' Application, are consistent with SoCalGas' recommendation that this measure be included in SoCalGas' 2017-2020 measure mix. In addition, the measure provides significant water savings, and offers cost effectiveness metrics that compare favorably to the balance of SoCalGas' portfolio.

SoCalGas plans to begin installing tub spouts in first quarter 2017.

Protests

Anyone may protest this Advice Letter to the Commission. The protest must state the grounds upon which it is based, including such items as financial and service impact, and should be submitted expeditiously. Pursuant to discussions held with Energy Division, SoCalGas hereby requests that the protest must be made in writing and received by March 14, 2017, which is five days from the filing of this Advice Letter. There is no restriction on who may file a protest. The address for mailing or delivering a protest to the Commission is:

CPUC Energy Division Attn: Tariff Unit 505 Van Ness Avenue San Francisco, CA 94102

Copies of the protest should also be sent via e-mail to the attention of Energy Division Tariff Unit (<u>EDTariffUnit@cpuc.ca.gov</u>). A copy of the protest should also be sent via both e-mail <u>and</u> facsimile to the address shown below on the same date it is mailed or delivered to the Commission.

Attn: Ray B. Ortiz
Tariff Manager - GT14D6
555 West Fifth Street
Los Angeles, CA 90013-1011
Facsimile No. (213) 244-4957

E-mail: ROrtiz@SempraUtilities.com

Effective Date

SoCalGas believes this Advice Letter is subject to Energy Division disposition and, at the direction of Energy Division, should be classified as Tier 1 (effective pending disposition) pursuant to General Order (GO) 96-B. Therefore, SoCalGas respectfully requests that this Advice Letter become effective on January 27, 2017, which is the date requested on Advice No. 5084.

Notice

A copy of this Advice Letter is being sent SoCalGas' GO 96-B service list and the Commission's service list in A.14-11-007. Address change requests to the GO 96-B should be directed by electronic mail to tariffs@socalgas.com or call 213-244-3387. For changes to all other service lists, please contact the Commission's Process Office at 415-703-2021 or by electronic mail at Process Office@cpuc.ca.gov.

Ronald van der Leeden Director - Regulatory Affairs

Attachments

CALIFORNIA PUBLIC UTILITIES COMMISSION

ADVICE LETTER FILING SUMMARY ENERGY UTILITY

MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)					
Company name/CPUC Utility No. SOL	THERN CALIFO	RNIA GAS COMPANY (U 904G)			
Utility type:	Contact Person: R	ay B. Ortiz			
□ ELC □ GAS	Phone #: (213) 244-3837				
☐ PLC ☐ HEAT ☐ WATER	E-mail: ROrtiz@se				
EXPLANATION OF UTILITY TY		(Date Filed/ Received Stamp by CPUC)			
ELC = Electric GAS = Gas					
PLC = Pipeline HEAT = Heat W	VATER = Water				
Advice Letter (AL) #: 5084-A					
Subject of AL: Supplement - Notification	on of Updated Ener	gy Savings Assistance (ESA) Program			
Thermostatic Tub Spout Measure Savin	ngs				
Keywords (choose from CPUC listing):	Energy Efficiency				
AL filing type: Monthly Quarter	ly 🗌 Annual 🔀 On	e-Time 🗌 Other			
If AL filed in compliance with a Commi	ission order, indicat	e relevant Decision/Resolution #:			
None					
Does AL replace a withdrawn or rejecte	ed AL? If so, identif	fy the prior AL No			
Summarize differences between the AL	and the prior with	drawn or rejected AL¹: N/A			
	<u>-</u>				
Does AL request confidential treatmen	t? If so, provide exp	lanation: No			
	71				
Resolution Required? Yes No Tier Designation: 1 2 3					
Requested effective date: 1/27/17		No. of tariff sheets: _0			
Estimated system annual revenue effect	ct: (%): <u>N/A</u>				
Estimated system average rate effect (9	%): N/A				
When rates are affected by AL, include	attachment in AL	showing average rate effects on customer classes			
(residential, small commercial, large Ca					
Tariff schedules affected: N/A					
Service affected and changes proposed ¹	: N/A				
Pending advice letters that revise the s	same tariff sheets:]	N/A			
Protests and all other correspondence this filing, unless otherwise authorized		are due no later than 20 days after the date of on, and shall be sent to:			
CPUC, Energy Division					
Attention: Tariff Unit	- •				
505 Van Ness Ave., 555 West 5th Street, GT14D6					
	San Francisco, CA 94102 Los Angeles, CA 90013-1011				
EDTariffUnit@cpuc.ca.gov	·	Cortiz@semprautilities.com			
		Cariffs@socalgas.com			

 $^{^{\}rm 1}$ Discuss in AL if more space is needed.

ATTACHMENT A

Advice No. 5084-A

Workpaper SWWH001v00

Auto-Diverting Tub Spout with Thermostatic Shut-off Valve

- Tub Spout Calculations (Attachment A to Workpaper SWWH001v00)
- Tub Spout and Showerhead Cost Data (Attachment B to Workpaper SWWH001v00)

Workpaper SWWH001v00 Revision #0

Southern California Gas Company

Auto-Diverting Tub Spout with Thermostatic Shut-off Valve

AT-A-GLANCE SUMMARY

Measure Codes	ShwFLr005, ShwFLr006	ShwFLr007, ShwFLr008
Measure Description	The Auto-diverting tub spout (5.0 gpm) with thermostatic shut-off valve purges cold water through tub spout until the water raises to 95° F. The water is then diverted to the showerhead at a trickle until full flow (1.5 gpm) is activated via the pull cord.	The Auto-diverting tub spout (5.0 gpm) with thermostatic shut-off valve purges cold water through tub spout until the water raises to 95° F. The water is then diverted to the showerhead at a trickle until full flow (1.5 gpm) is activated via the pull cord.
Base Case Description	5.0 gpm tub spout with a 2.0 gpm showerhead combo	5.0 gpm tub spout with a 1.8 gpm showerhead combo
Units	Each	Each
Energy Savings	Refer to Excel Saving Calculation Attachment A	Refer to Excel Saving Calculation Attachment A
Full Measure Cost (\$/unit)	\$119.99	\$119.99
Incremental Measure Cost (\$/unit)	\$94.00	\$91.38
Effective Useful Life	10 years (DEER EUL ID: WtrHt-WH-Shrhd)	10 years (DEER EUL ID: WtrHt-WH-Shrhd)
Measure Installation Type	New Construction (NEW/NC), Replace on Burnout (ROB)	Early Retirement (ER)
Net-to-Gross Ratio	0.7 (DEER NTGR ID: All-Default<=2yrs) 0.85 (DEER NTGR ID : Res-Default-HTR-di)	0.7 (DEER NTGR ID: All-Default<=2yrs) 0.85 (DEER NTGR ID : Res-Default-HTR-di)
Important Comments	Calculated water savings for single family and multi-family are 1806.95 and 2017.62 gallons per year respectively. This Workpaper has a complementary Ex Ante Database dataset that will be provided in a separate submission to the California Public Utilities Commission (CPUC).	Calculated water savings for single family and multi-family are 1806.95 and 2017.62 gallons per year respectively. This Workpaper has a complementary Ex Ante Database dataset that will be provided in a separate submission to the California Public Utilities Commission (CPUC).

REVISION HISTORY

Rev	Date	Author	Summary of Changes
0	04/25/16	Miguel Urrea (SCG)	Initial Release

COMMISSION STAFF AND CAL TF COMMENTS

Rev	Party	Submittal Date	Comment Date	Comments	WP Developer Response

Cal TF website: http://www.caltf.org/

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SECTION 1. GENERAL MEASURE & BASELINE DATA

1.1 Measure Description & Background

For users intending to save energy and water during showers this measure offers a unique option, not until recently, available in the market. The Auto-diverting Tub Spout (ADTS) with thermostatic shut-off valve (TSV) replaces tub spouts and showerheads in the residential market with shower-bathtub combos (62% of all showers¹). With behavioral waste continuing to be a significant problem² during shower warm-ups along with leaky tub spouts³ new technologies are needed. This measure saves energy and water by reducing shower warm-up waste, replaces leaky tub spouts, and lowering the showerhead flowrate. Mobile home savings are the same as single-family home savings and will not have a separate energy impact profile. NEW and ROB measures types will use code baseline from 2016 – 2.0 gpm showerhead. ER measure type will use code baseline from 2018 – 1.8 gpm due to the RUL of 3 years.

Table 1 -Base, Standard, and Measure Cases

Case	Description of Typical Scenario	
Measure	Auto-diverting Tub Spout (5.0 gpm) with thermostatic shut-off valve and 1.5	
	gpm showerhead	
Existing Condition	5.0 gpm tub spout with a 2.25 gpm showerhead	
Code/Standard (2016)	5.0 gpm tub spout with a 2.0 gpm showerhead	
Code/Standard (2018)	5.0 gpm tub spout with a 1.8 gpm showerhead	
Industry Standard Practice	N/A	

Table 2 - Measures and Codes

Table 2 - Ivieasules allu Coues				
Measure Codes			Measure Name	
SCG	SDG&E	SCE	PG&E	
ShwFLr005				Auto-diverting Tub Spout with thermostatic shut-off valve
				Showerhead (1.5 gpm) –Gas
ShwFLr006				Auto-diverting Tub Spout with thermostatic shut-off valve
				Showerhead (1.5 gpm) –Electric
ShwFLr007				Auto-diverting Tub Spout with thermostatic shut-off valve
				Showerhead (1.5 gpm) –Gas
ShwFLr008				Auto-diverting Tub Spout with thermostatic shut-off valve
				Showerhead (1.5 gpm) –Electric

Describe requirements for these measures, including:

- Eligibility requirements: Water heating source using natural gas or electricity distributed by IOU. The measure cannot be applied where tankless water heaters are used. Instantaneous tankless water heaters may have different effect on savings with thermostatic shut-off valves. Not compatible with showers containing a wall mounted diverter
- **Implementation and installation requirements**: Measures presented in this Workpaper apply to single-family, mobile, and multi-family residential households.

¹ Residential End Uses of Water (Mayer, 1999).

² Disaggregating Residential Shower Warm-Up Waste (Sherman, 2014).

³ Leaking Shower Diverters (Taitem Engineering, 2011).

 Other program restrictions and guidelines: Make and model number must be included with a copy of the purchase receipt. Product must be certified by International Association of Plumbing and Mechanical Officials (IAPMO).

1.2 TECHNICAL DESCRIPTION

The ATDS with TSV helps to reduce structural waste, diminish behavioral waste to a trickle, stop tub spout leak, and lowers the showerhead flow rate to 1.5 gpm. These benefits are realized through the use of a flow diverter and TSV within the tub spout that detects when water reaches 95° F. The technology purges the cold water in the shower piping through the spout causing faster hot water arrival water with less water (structural waste)². Once the hot water arrives, the diverter changes the flow direction to the showerhead where the water flow is reduced to a trickle with no tub spout leak. Then the user simply pulls the lanyard on the showerhead to open the valve and allow normal water flow.

Figure 1 -**How the ADTS System Works** 1. Turn water on. 2. Cold water exits tub spout. 3. Tub spout automatically closes once hot water arrives. 4. Hot water is automatically 5. Specialized showerhead 6. User pulls cord to activate trickles by default so hot water is diverted to specialized specialized showerhead's normal showerhead (integrated normally not flowing until user is ready to flow and begins showering.

SWWH001v00, Revision #0
Southern California Gas Company

closed valve).

shower.

1.3 Installation Types and Delivery Mechanisms

The Tub Spout will be offered as a direct install and as a downstream rebate. These delivery channels were selected to deliver the Tub Spout since they are the same as current low flow showerhead program.

Table 3 - Installation Type Descriptions

Installation Type	Savings		Life	
	1 st Baseline (BL)	2 nd BL	1 st BL	2 nd BL
Replace on Burnout (ROB)	Above Code or Standard	N/A	EUL	N/A
New Construction (NEW/NC)	Above Code or Standard	N/A	EUL	N/A
Retrofit or Early Replacement (RET/ER)	Above Customer Existing	Above Code or Standard	RUL	EUL-RUL

A delivery mechanism is a delivery method paired with an incentive method. Delivery mechanisms are used by programs to obtain program participation and energy savings.

Table 4 - Delivery Method Descriptions

Delivery Method	Description
Financial Support	The program motivates customers, through financial incentives such as rebates or low
	interest loans, to implement energy efficient measures or projects.
New Construction	The program offers financial incentives and/or design assistance to customers involved with
	new building construction. This is intended is to motivate customer to exceed Title 24
	building energy efficiency requirements (residential or nonresidential).

Table 5 - Incentive Method Descriptions

Incentive Method	Description
Direct Install	The program implements energy efficiency measures for qualifying customers, at no cost to
	the customer.
Down-Stream Incentive	The customer installs qualifying energy efficient equipment and submits an incentive
	application to the utility program. Upon application approval, the utility program pays an
	incentive to the customer. Such an incentive may be deemed or customized.

1.4 MEASURE PARAMETERS

1.4.1 DEER Data

There are currently no DEER measures that apply to this type of technology.

Table 6 - DEER Difference Summary

DEER Item	Used for Workpaper?
Modified DEER methodology	No
Scaled DEER measure	No
DEER Base Case	No
DEER Measure Case	No
DEER Building Types	Yes
DEER Operating Hours	No
DEER eQUEST Prototypes	No
DEER Version	DEER 2016
Reason for Deviation from DEER	DEER does not contain this type of measure.
DEER Measure IDs Used	N/A

Net-to-Gross Ratio

The NTG values were obtained using the DEER READI tool⁴. The relevant NTG values for the measures in this Workpaper are in the table below. This is a new technology that varies from the standard low flow showerhead and thermostatic shut-off valve.

Table 7 - NTGR ID

NTGR ID	Description	Sector	BldgType	Measure Delivery	NTGR
All-Default	All other EEM with no evaluated NTGR; new	All	Any	Any	0.7
<=2yrs	technology in program for 2 or fewer years				
Res-Default-	All other EEM with no evaluated NTGR;	Res	Any	DirInstall	0.85
HTR-di	direct install hard-to-reach only.				

^{*}Direct install measures that are not hard-to-reach will use the default NTG value.

Spillage Rate

Spillage rates are not tracked in Workpapers; they are tracked in an external document which will be supplied to the Commission Staff.

Installation Rate

The GSIA ID for low flow showerheads with flow restrictor valve and without flow restrictor valve is the closest technology description to the ADTS with TSV. Neither of the GSIA IDs are applicable to this Workpaper because of the forced tub spout warm-up and the type of installation required for this technology. The default GSIA ID is used. The GSIA values were obtained using the DEER READI tool⁴. The relevant IR values for the measures in this Workpaper are in the table below.

Table 8 - GSIA ID

140.00					
GSIA ID	Description	Sector	BldgType	ProgDelivID	GSIAValue
Def-GSIA	Default GSIA values	Any	Any	Any	1

Effective and Remaining Useful Life

The EUL and RUL values were obtained using the DEER READI tool⁴. DEER defines the RUL as 1/3 of the EUL value. The RUL value is only applicable to the first baseline period for an RET measure with an applicable code baseline. The DEER effective useful life for low-flow showerheads was employed as the technologies are subjected to very similar conditions and would be expected to have approximately the same EUL of 10 years⁵. The relevant EUL and RUL values for the measures in this Workpaper are in the table below.

Table 9 -EUL ID

EUL ID	Description	Sector	UseCategory	EUL (Years)	RUL (Years)
WtrHt-WH-	Low-Flow Showerhead	Res	SHW	10	3.3
Shrhd					

⁴ (Remote Ex-Ante Database Interface, 2015).

⁵ Tub Spout Flow-Reduction Systems Test (Hsia, 2015).

1.4.2 Codes and Standards Analysis

Table 10 - Code Summary

Code	Reference Effective Date	
Title 20 (2014) ⁶	Section 1605.3	July 1, 2016

Table 11 - Standards for Showerheads

Appliance	Maximum Flow Rate			
	Manufactured on or after	Manufactured on or after	Manufactured on or	
	January 1, 1994 and prior	July 1, 2016 and prior to	after July 1, 2018	
	to July 1, 2016	July 1, 2018		
Showerheads	2.5 gpm at 80 psi	2.0 gpm at 80 psi	1.8 gpm at 80 psi	

^{*}Taken from Title 20 Section 1605.3 Table H-5

1.5 EM&V, Market Potential, and Other Studies – Base Case and Measure Case Information

In order to establish savings, conservative values were chosen.

1.5.1 Disaggregating Residential Shower Warm-Up Waste (Sherman 2014)

An Understanding and Quantification of Behavioral Waste Based On Data from Lawrence Berkeley National Lab

Туре	Analysis of shower water waste data
Author	Troy Sherman of Evolve Technologies LLC
Completion Date	August 2014
Time Frame	2013 to 2014
Market Covered	Single Family
Techniques Used	1,057 Survey respondents and 19 homes monitored throughout California
Relevance/Impacts	This study quantifies structural waste and behavioral waste time frames due to
	shower warm-ups in single family homes. The data and findings from this study
	help establish the base case consumption and water savings for this Workpaper.
Concerns (Survey	The flow rate average of the dedicated showers and tub/shower combos
Techniques, # of	participating in the study was 1.79 gpm. This average is significantly below the
respondents,	typical 2.2 gpm flow rates sited in multiple REUW studies. The lower average
etc)	flow rates indicate the study's participants are likely more conservation oriented
	than average and, as a result, could be producing less total warm-up waste than
	typical. Data does not take multi-family residents into consideration, but is used
	in Workpaper as best available data.

1.5.2 Evaluation of Potential Best Management Practices – Residential Hot Water Distribution (Koeller 2007)

An analysis of the waste of water that occurs in a typical household between the times the tap/fixture is turned on and desired useful hot water arrives.

⁶ Water Appliance Amendments (California Energy Commission, 2016).

Туре	Research on structural water waste
Author	John Koeller of Koeller and Company
Completion Date	October 2006
Time Frame	2005
Market Covered	Single Family and multi-family
Techniques Used	Laboratory tests
Relevance/Impacts	This study quantifies structural waste in terms of water in pipe (100 ft. of pipe).
	The study focuses on how various flow rates affect structural waste.
Concerns (Survey	No concerns
Techniques, # of	
respondents,	
etc)	

1.5.3 Taitem Tech Tip – Leaking Shower Diverters (Taitem 2011)

Diverter valves with leaks in shower mode waste both water and energy.

Туре	Research on leaking shower diverters
Author	Taitem Engineering
Completion Date	2011
Time Frame	2011
Market Covered	Single Family and multi-family
Techniques Used	Survey of 130 apartment and houses with 120 bath/shower units w/ diverters
Relevance/Impacts	Study found that 34% of the diverters leaked more than 0.1 gallons per minute
	(gpm) with the average at 0.8 gpm.
Concerns (Survey	No concerns
Techniques, # of	
respondents,	
etc)	

1.5.4 Residential End Uses of Water (REUW 1999)

Study designed to provide specific data on the end uses of water in single-family residential settings across the country.

Туре	Study on single family end use of water
Author	Peter W. Mayer and William B. DeOreo of Aquacraft, Inc.
Completion Date	1999
Time Frame	1996 to 1997
Market Covered	Single Family
Techniques Used	Survey of 5,000 households and detailed end use study of 1,200 households.
Relevance/Impacts	Mean shower volume is 17.2 gallons
Concerns (Survey	No concerns
Techniques, # of	
respondents,	
etc)	

1.5.5 SEU Survey conducted by ASW (ASW 2009)

Data from various residential water measurements and household questionnaire responses from Feb to May 2009

Туре	Survey on residential water use
Author	ASW
Completion Date	2009
Time Frame	February to May 2009
Market Covered	Single Family
Techniques Used	Survey of 249 households.
Relevance/Impacts	Mean number of showerheads in single family household is 2.01. Pre-existing showerheads flow rate is 2.25 gpm.
Concerns (Survey	No concerns
Techniques, # of	
respondents,	
etc)	

1.5.6 The End Use of Hot Water in Single Family Homes from Flow Trace Analysis (Aquacraft 2000)

Single family hot water use study.

Туре	Study on single family end use of hot water
Author	Peter W. Mayer and William B. DeOreo of Aquacraft, Inc.
Completion Date	2000
Time Frame	October 1999 – 14 days
Market Covered	Single Family
Techniques Used	Survey and measurements of 10 Seattle homes.
Relevance/Impacts	Water trace data from ten single family homes in Seattle (Aquacraft, Inc., 2000) showed that the mean shower duration is 7.4 minutes. Another measurement study of residential end use of water by AWWA Research Foundation (REUW 1999) shows the similar data, a median of 7.2 minutes and a mean of 8.2 minutes, for shower duration. Shower duration of 7.4 minutes, along with other assumptions used in this Workpaper, results in more realistic baseline shower water consumption that is equivalent to about 33% of the total domestic hot water consumption
Concerns (Survey	Low sample size.
Techniques, # of	
respondents,	
etc)	

1.6 Data Quality and Future Data Needs

There is currently no single study which is recognized as a statewide acceptable report on the use of hot water in tub/shower combos for single family and multi-family units. The studies listed above are the best available data. Further research is needed both in the area of hot water usage in tub/shower combos (including warm-up practices) and current pre-existing conditions for both tub spout and

showerhead. Due to the recent and upcoming code changes for showerhead flow rates in combination with the current drought in California the pre-existing showerhead flow rates should be revisited.

SECTION 2. CALCULATION METHODOLOGY

2.1 METHODOLOGY

SoCal Gas completed three steps to estimate ex ante energy savings:

- 1. Establish Base Case Water Usage:
 - Structural waste (time hot water takes to reach the water fixture)
 - percentages of showerhead warm up versus tub spout warm up
 - o Behavioral waste (time user takes to enter shower minus structural waste time)
 - Percentages of tub spout warm up while multitasking
 - Tub spout leak percentage and rate
 - Shower time and water usage
 - Showerhead and tub spout flow rate
 - Showers mixed daily water usage single family and multi-family
 - Showers per day single families and multi-family
- 2. Calculate Water Savings due to:
 - Forced tub spout warm-up
 - o Removal of behavioral waste
 - o Removal of tub spout leak
 - o Reduction in Showerhead flow rate
- 3. Convert Water Savings to Energy Savings:
 - Convert water savings to therm savings
 - Convert therm savings to kWh savings
 - Calculate kW savings from kWh savings

2.2 CALCULATIONS

The energy saved comes from four different pieces. First part from structural waste, second from behavioral waste, third from leaky tub spout, and the fourth from reduced water flow during shower. Calculations resulted in similar findings as found in "Auto-Diverting Tub Spout System with ShowerStart TSV⁷."

2.2.1 Data, Assumptions, and Conversion Factors

The table below summarizes the base case assumptions and data derived from studies.

⁷ (Sherman, Auto-Diverting Tub Spout System with ShowerStart TSV, 2015).

Table 12 - Base Case Parameters and Assumptions

Variable	Description	Base Case	Source
(ShFr)	Showerhead Flow Rate =	2 gpm	Title 20 (2015) Section 1605.3
(TFr)	Tub Spout Flow Rate =	5 gpm ¹	
(C ₁)	Seconds to Minutes =	60 sec/min	
(SFMDW - 2.25 gpm)	Single Family Mixed Daily Water for Showers =	28.01 gal/day	Disposisiton - For 2.25 gpm
(MFMDW - 2.25 gpm)	Multifamily Mixed Daily Water for Showers =	23.34 gal/day	Disposisiton - For 2.25 gpm
(ShWu)	% of Showerhead Warm-up =	60% %	Sherman 2014, pg 8
(TsWu)	% of Tub Spout Warm-up =	40% %	Sherman 2014, pg 5
(SP)	Showerhead Warm-up pipe water purged =	130% %	Koeller 2007, pg 44-45
(TsWuPWt)	Tub Spout Warm-up pipe water purged =	106% %	Koeller 2007, pg 44-45
(BWt)	Behavioral Waste (Time) =	47 sec/shower	Sherman 2014, pg 11
(BWp)	Behavioral Waste (% of Warm-up Waste) =	59% %	Sherman 2014, pg 11
(TMWu)	Tub Multitasking Warmup =	58% %	Sherman 2014 - pg 5
(TsIP)	Tub Spout Leak (Percentage) =	34% %	Taitem 2011 - pg 2
(TsIR)	Tub Spout Leak (Rate) =	0.8 gpm	Taitem 2011 - pg 2
(TShWuPr)	Total Shower Water Usage Pre-existing =	17.2 gal/shower	REUWS 1999 - pg 102 Table 5.6
(SFSh)	Single Family Showerheads =	2.01 showerheads	ASW study
(MFSh)	Multifamily Showerheads =	1.5 showerheads	US Census
(Sht)	Shower Time =	7.4 min	Aquacraft, Inc., 2000 - pg 8

Showerhead Flow Rate

With previous established 2.25 gpm in preexisting condition⁸ and the recent code update to 2.0 gpm,⁶ it was decided to use code as the current code baseline and 1.8 gpm for early retirement code baseline due to the 3 year RUL period.

Tub Spout Flow Rates

With limited studies on tub spout flow rates a market assessment shows significant spouts available above 5 gpm. Since 5 gpm is the flow rate of the ADTS, it was chosen as the baseline flow rate so no savings would be derived from the tub spout flow rate alone.

⁸ SEU Survey Conducted by ASW (ASW, 2009).

Mixed Daily Water for Showers

The 2013-2014 domestic hot water fixture disposition⁹ set the mixed daily water for shower usage with a 2.25 gpm showerhead. The ratio of the values 2.25 gpm over 2.0 gpm showerhead were used to calculate the baseline mixed daily water usage. Mixed daily water usage is used to calculate the number of showers taken per day.

Structural Waste

In tub/shower combos the user has the option to purge the cold water via the showerhead or the tub spout. Tub spout warm-ups are found to save both time and energy when compared to showerhead warm-ups due to the faster gpm¹⁰. Tub spout warm-ups are found to occur during 40% of the time in tub/shower combos². Structural waste time is calculated by subtracting out the behavioral waste time from the total warm-up waste time.

Behavioral Waste

From the time when the water reaches desired temperature until the user gets in the shower. Because of the faster warm-up with a tub spout it is more likely that the user will sit near the tub to wait for hot water before entering the shower. This does not always occur and 58% of users initiating a tub spout warm-ups were found to multitask during warm-up². Behavioral waste time varies, and as such, a conservative value was taken².

Weighted Average Showerheads per Household

The survey data from SEU territories⁸ was averaged to be 2.01 showerheads per single family household. Acquired data from the U.S. Census Bureau¹¹ was used to calculate the weighted average showerheads per household for the multi-family residences. The data for number of bathrooms per household for new construction of multi-family units between the years 1978-2014 was used. After the weighted average was calculated, the result was rounded up to the nearest tenth. Savings are conservative since rounding this number up results in lower savings. The calculations are shown in the appendix.

Shower duration

Water trace data from ten single family homes in Seattle (Aquacraft, Inc., 2000)¹² showed that the mean shower duration is 7.4 minutes. Another measurement study of residential end use of water by AWWA Research Foundation (REUW 1999)¹ shows the similar data, a median of 7.2 minutes and a mean of 8.2 minutes, for shower duration. Shower duration of 7.4 minutes, along with other assumptions used in this Workpaper, results in more realistic baseline shower water consumption that is equivalent to about 33% of the total domestic hot water consumption.

Showerhead Temperature

For low flow showerheads, the outlet water heater temperature is assumed to be 106°F to account for tempering of the hot water with cold water to establish full shower flow, as obtained from the ASW survey study in SEU territories. Hot water does not comprise the entire shower flow, so evaluating a smaller water heater temperature rise limits the water heater energy attributable to entire shower flow.

⁹ Water Fixture Disposition (CPUC, 2013).

¹⁰ Residential Hot Water Distribution (Koeller & Klein, 2007).

¹¹ Bathrooms (US Census, 2014).

¹² The End Use of Hot Water in Single Family Homes from Flow Trace Analysis (Mayer & DeOreo, 2000).

The water temperature entering the heater varies with climate zones according to the 2013 Title 24¹³ weather data.

Gas Water Heater Efficiencies

To convert the water heating load to energy use at the water heater, the recovery efficiency (RE) is used. A weighted value of 0.813 is derived from the current CEC maintained Title 20 Appliance Database¹⁴ (downloaded on March 25, 2016) of natural-gas fired, storage-type water heaters without limit to the listed EF. An RE of 0.98 is used for Electric Water heaters, taken from 2013-2014 Water Fixture Disposition⁹.

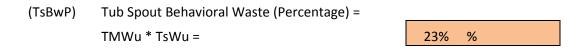
2.2.2 Establish Base Case Water Usage

Base case water usage is broken into three parts: structural, behavioral, and shower usage.

Structural Usage

(StWt)	Structural Waste (Time) =		
	BWt / BWp - BWt =	33	sec/Warm-up
(TslStw)	Tub Spout Leak during Structual Waste Time		
	StWt / C1 * TsIR =	0.440	gal/Warm-up
(ShStw)	Shower Structure Waste =		
	StWt / C1 * ShFr =	1.10	gal/Warm-up
(WtP)	Amount of Water in Pipe =		
	ShStw / SP =	0.85	gal
(TsStw)	Tub Structure Waste =		
	WtP * TsWuPWt =	0.89	gal/Warm-up
(WStwTsIW)	Weighted Structural Waste w/ Tub Spout Leak Weighted	! =	
	(ShStw + TslStw * TslP) * ShWu + TsStw * TsWu =	1.11	gal/Warm-up

Behavioral Usage



¹³ (2013 Building Energy Efficiency Standards, 2013).

¹⁴ (California Energy Commission Appliance Efficiency Database, 2016).

(TslBw) Tub Spout Leak during Behavioral Waste

BWt / C1 * TsIR =

0.627 gal/Warm-up

(ShBw) Shower Behavioral Waste =

BWt / C1 * ShFr =

1.57 gal/Warm-up

(TsBw) Tub Behavioral Waste =

BWt / C_1 * TSFr =

3.92 gal/Warm-up

(WBwTsIW) Weighted Behavioral Waste w/ Tub Spout Leak Weighted=

(ShBw + TslBw * TslP) * ShWu + TsBw * Bwp =

1.98 gal/Warm-up

Shower Usage

(ASht) Actual Shower Time =

Sht - (StWt + BWt) / C_1 =

6.07 min

(AShtWuTsIW) Actual Shower Time Water Usage W/ Tub Spout Leak Weighted=

Asht * (ShFr + TsIR * TsIP) =

13.78 gal/shower

2.2.3 Calculating Water Savings

Water savings come from the forced tub spout warm-up, removal of behavioral waste, removal of tub spout leak, and reduction in showerhead flow rate.

Forced Tub Spout Warm-up

(TsStw) Tub Structure Waste =

WtP * TsWuPWt =

0.89 gal/Warm-up

(WStwTslW) Weighted Structural Waste w/ Tub Spout Leak Weighted=

(ShStw + TslStw * TslP) * ShWu + TsStw * TsWu = 1.11 gal/Warm-up

(StWtrS) Structural Water Savings =

WStwTsIW - TsStw=

0.21 gal/Warm-up

Removal of Behavioral Waste

(WBwTslW) Weighted Behavioral Waste w/ Tub Spout Leak Weighted=

(ShBw + TsIBw * TsIP) * ShWu + TsBw * Bwp =

1.98 gal/Warm-up

(BWtrS) Behavioral Water Savings = WBwTslW - 0 =

1.98 gal/Warm-up

Removal of Tub Spout Leak and Reduction in Showerhead Flow Rate

A 2.0 gpm Showerhead flowrate is used in the base case (AShtWuTslW) formula and 1.5 in the proposed case (AShtWuP) formula.

(AShtWuTslW) Actual Shower Time Water Usage W/ Tub Spout Leak Weighted=

Asht * (ShFr + TslR * TslP) =

13.78 gal/shower

(AShtWuP) Actual Shower Time Water Usage W/out Tub Spout Leak =

Asht * ShFr =

9.10 gal/shower

(ShtWtrS) Shower Time Water Savings =

AShtWuTslW - AShtWuP =

4.68 gal/shower

Total Shower Water Savings

(TShWtrS) Total Shower Water Savings w/ Tub Spout Leak Weighted=

StWtrS + BWtrS + ShtWtrS

6.87 gal/shower

Annual Single Family Water Savings

(SFMDW -

2.0 gpm) Single Family Mixed Daily Water =

24.90 gal/day

(SFSpD) SF Showers per Day - Showerhead =

SFMDW / (TShWuPr * SFSh) = 0.7

0.72 showers/day

gal/year

(SFWtrS) SF Water Savings =

TShWtrS * SFSpD * 365 days/year = 1806.95

Annual Multi-family Water Savings

(MFMDW -

2.0 gpm) Multi-family Mixed Daily Water =

20.75 gal/day

(MFSpD) MF Showers per Day - Showerhead =

MFMDW / (TShWuPr * MFSh) = 0.80 showers/day

(MFWtrS) MF Water Savings =

TShWtrS * MFSpD * 365 days/year = 2017.62 gal/year

2.3.4 Convert Water to Energy Savings

Water to Gas Savings

The natural gas savings is equal to the energy required to raise the volume of water saved from ground water temperature to the water temperature at the showerhead. The values and equation used to make the conversion is shown below.

$$E_{therm \, saved} = \left[\frac{(W_{savings} * \rho * C_{p} * (T_{out} - T_{in})_{water \, heater})}{RE_{Gas} * C_{volume}}\right] * \left[\frac{1 \, Therm}{100,000 \, BFU}\right]$$
where,
$$- W_{savings} = Water \, Savings$$

$$- \rho = 62.37 \frac{ibm}{f \, c^{2}}; Water \, Density \, at \, 60 \, °F$$

$$- C_{p} = 1 \frac{btw}{ibm}; Water \, Specific \, Heat \, at \, 60 \, °F$$

$$- T_{out} = 106 \, °F; \, Water \, Temp \, at \, Showerhead$$

$$- T_{in} = Climate \, Zone \, Specific; \, Cold \, Water \, Temperature$$

$$- RE_{Gas} = 0.813; \, Recovery \, Efficiency$$

$$- C_{volume} = 7.5 \frac{gal}{col}; \, Gallons \, to \, Cupic \, Feet \, Conversion$$

Water to Electric Savings

The Electric savings (kWh) is equal to the energy required to raise the volume of water saved from ground water temperature to the water temperature at the showerhead. The power consumption (kW) is defined by the percentage of the daily hot water consumed during peak period.

$$\begin{split} E_{kWh\,saved} &= \left[\frac{(W_{savings} * \rho * C_p * (T_{out} - T_{in})_{waterheater})}{RE_{Eleo} * C_{volume} * C_{kWh}} \right] \\ &= \left[\frac{E_{therm\,saved} * RE_{Gas}}{RE_{Eleo} * C_{kWh}} \right] * \left[\frac{100,000\,BTU}{1\,Therm} \right] \end{split}$$

where.

-
$$RE_{Elec} = 0.98$$
; Recovery Efficiency
- $C_{kWh} = 3412 \frac{bbu}{kWh} | kWh to btu Conversion$
 $E_{kWsaved} = \left[\frac{E_{kWh saved} * E_{pp}}{365 \text{ days/year} * 3} \right]$

$$B_{kWsaved} = \begin{bmatrix} \frac{B_{kWhsaved} \times B_{pp}}{365 \text{ days/vear} \times 3} \end{bmatrix}$$

where.

 $E_{pp} = 0.11$; Percentage of daily DHW energy consumption during peak period

SECTION 3. LOAD SHAPES

Load shapes are used for portfolio lifecycle cost analysis. A load shape indicates the distribution of a measure's energy savings over one year. A load shape is a set of fractions summing to unity, with one fraction per hour (or other time period). Multiplying a savings value by the load shape value for any particular hour yields the energy savings for that particular hour.

The ideal load shape for net benefits estimates would represent the difference between the base case and measure case. The closest load shapes that are applicable to the measures in this Workpaper are listed in the table below.

Table 13 - Building Types and Load Shapes

Building Type	Load Shape	E3 Alternate Building Type
Residential Mobile Home - Double-	Residential	HeatPump_WtrHt-RC
Wide		
Residential Multi-family	Residential	HeatPump_WtrHt-RC
Residential Single Family	Residential	HeatPump_WtrHt-RC

SECTION 4. COSTS

4.1 BASE CASE COST

Available DEER cost data for low flow showerheads comes from DEER 2008 and the 2010-2012 Measure Cost Study (MCS). MCS was used for labor/installation cost data, but since no GPM was listed for the showerhead a vendor cost study was performed for showerhead and tub spout cost. Cost data can be found in Attachment B.

Table 14 - Base Case Cost

Measure	Product Description	Equipment	Labor/	Maintenance/	Total Base
Code		Cost	Installation	Other Cost	Case Cost
			Cost		
ShwFLr005,	2.0 GPM Showerhead	\$38.62	\$15.67		\$54.29
ShwFLr006					
ShwFLr007,	1.8 GPM Showerhead	\$41.23	\$15.67		\$56.91
ShwFLr008					
ShwFLr005,	5.0 GPM Tub Spout with	\$28.03	\$15.67		\$43.70
ShwFLr006,	Diverter				
ShwFLr007,					
ShwFLr008					
ShwFLr005,	Showerhead and Tub	\$66.65	\$31.34		\$97.99
ShwFLr006	Spout with Diverter				
ShwFLr007,	Showerhead and Tub	\$69.27	\$31.34		\$100.61
ShwFLr008	Spout with Diverter				

4.2 MEASURE CASE COST

There is no available cost data for this measure. Labor/installation cost was taken from discussion with contractors and equipment cost came from manufacturer.

Table 15 - Measure Case Cost

Measure Code	Product Description	Equipment Cost	Labor/ Installation	Maintenance/ Other Cost	Total Base Case Cost
			Cost		
ShwFLr005,	ADTS w/single-function	\$119.99	\$72.00		\$191.99
ShwFLr006,	1.5 gpm Showerhead &				
ShwFLr007,	All Quick Connect				
ShwFLr008	Mounts				

4.3 Full and Incremental Measure Cost

Table 16 - Full and Incremental Measure Cost Equations

Installation	Incremental Measure Cost	Full Measure Cost						
Туре		1 st Baseline	2 nd Baseline					
ROB	(MEC + MLC) – (BEC + BLC)	(MEC + MLC) – (BEC + BLC)	N/A					
NEW/NC								
RET/ER	(MEC + MLC) – (BEC + BLC)	MEC + MLC	(MEC + MLC) – (BEC + BLC)					
REF	(MEC + MLC) – (BEC + BLC)	MEC + MLC	N/A					
REA	MEC + MLC	MEC + MLC	N/A					

MEC = Measure Equipment Cost; MLC = Measure Labor Cost BEC = Base Case Equipment Cost; BLC = Base Case Labor Cost

Table 17 - Full and Incremental Costs

Measure	Installation	Incremental Measure Cost	Full Measure Cost				
Code	Туре		1 st Baseline	2 nd Baseline			
ShwFLr005,	ROB/NC	\$94.00	\$94.00	N/A			
ShwFLr006,							
ShwFLr007,	ER	\$91.38	\$191.99	\$91.38			
ShwFLr008							

ATTACHMENTS

Attachment A – Tub Spout Calculations



Tub_Spout_Calculati ons_Rev0.xlsx

Attachment B – Tub Spout and Showerhead Cost Data



Tub_Spout_Showerh eads_Cost_Data.xlsx

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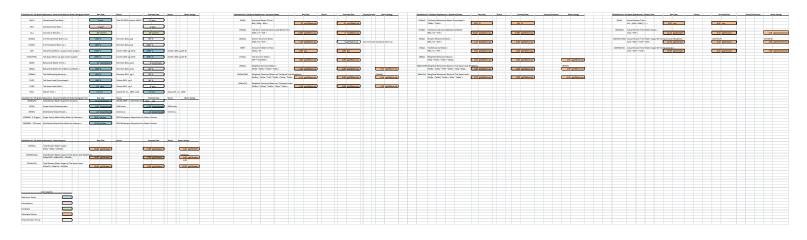
Tub Spout Calculations

(Attachment A to Workpaper SWWH001v00)

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Build Stretting Talk Second with the emodelist shall off Showerhead (3.5). Build Stretting Talk Second with the emodelist shall off Showerhead (3.5). Build diverting Talk Spood with the emodalist shall off Showerhead (3.5).	eard (2000 Cale) - Sas eard (2000 Cale) - Sas gard (2000 Cale) - Sas	Shartucos Shartucos Shartucos	NES NC NES NC	Preferences Preferences Preferences	SMm SMm	See See	Sash Sash Sash	PALME OF PALME OF	20 0.7 20 0.7 20 0.7	6.7 6.7 6.7					0 5.37 0 5.00 0 8.76	\$17.00 \$265.00 \$ \$17.00 \$265.00 \$
Suite diverting Tub Spood with thermodatin shot off Showeshead (2.5) Suite diverting Tub Spood with thermodatin shot off Showeshead (2.5) Suite diverting Tub Spood with thermodatin shot off Showeshead (2.5)	gon((2000 Code) =Gas gon((2000 Code) =Gas gon((2000 Code) =Gas	Shartucos Shartucos Shartucos	NES NC	Prefericiones Prefericiones Prefericiones	10 MFm	Sre Sre	Each Each	PALME C	20 07 20 07 20 07	6.7 6.7	1			-	0 8.70 0 8.90 0 8.97	\$17.00 \$267.00 \$ \$12.00 \$267.00 \$
Substituting Subspect with demodals shall off Shawnined (1.5) Substituting Subspect with demodals shall off Shawnined (1.5) Substituting Subspect with demodals shall off Shawnined (3.5)	goni (SSSCole) -Sas goni (SSSCole) -Sas goni (SSSCole) -Sas	Shartucos Shartucos Shartucos	NES NC	Prefericiones Prefericiones Prefericiones	DMn DMn	Sre Sre	Each Each	PALME C	20 07 20 07 20 07	6.7 6.7					0 8.77 0 8.77	\$67.00 \$262.00 \$ \$67.00 \$262.00 \$
Substitute (see Substitute Substi	romi (2006 Calir) -Sas goni (2006 Calir) -Sas goni (2006 Calir) -Sas	Shartsoon Shartsoon Shartsoon	NES NO.	Prefericiones Prefericiones Prefericiones	25 MFm 26 MFm 1 MFm	See See	Each Each Each	FALSE C	20 07 20 07	6.7 6.7					0 11.38 0 10.33	907.00 5.205.00 5 907.00 5.205.00 5
Justice diverting Tub Spool with the emuration chair off Dissertined (3.3), Suite diverting Tub Spool with the emuration chair off Dissertined (3.3), Suite diverting Tub Spool with the emuration chair off Dissertined (3.3)	gont (2006 Cale) -Gas gont (2006 Cale) -Gas	Ehertucos Ehertucos	NS NOS	PrefetOres PrefetOres	1 She 4 She	ia ia	Each Each	PALME C	2 07 2 07	67				-	C 9.08	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Suite diverting Tab Spood with the resordate chair off Showeshead (2.5) Suite diverting Tab Spood with the resordate chair off Showeshead (2.5)	gant (2006 Code) -Gas gant (2006 Code) -Gas	Sharbook Sharbook	NIS NOS	Preferences Preferences	6 She 7 She 8 She	1	Each Each	PALME C	20 0.7 20 0.7	6.7 6.7					0 8.21 0 8.06	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Suite diverting Tab Speed with thermodatic shart off Showeshead (2.1). Suite diverting Tab Speed with thermodatic shart off Showeshead (2.1). Suite diverting Tab Speed with thermodatic shart off Showeshead (2.1).	gon((2000 Cale) -Gas gon((2000 Cale) -Gas gon((2000 Cale) -Gas	Ehertucos Ehertucos	NIS NOS	PrefetOres PrefetOres PrefetOres	9 55m 20 55m 10 55m	ia ia	Each Each	PALSE C	20 07 20 07	6.7 6.7				-	0 7.81 0 7.78 0 8.00	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Suite diverting Tab Speed with the remarkation that off Showeshead (2.1). Suite diverting Tab Speed with the remarkation that off Showeshead (2.1). Suite diverting Tab Speed with the remarkation that off Showeshead (2.1).	gont (2000 Cale) -Cas gont (2000 Cale) -Cas gont (2000 Cale) -Cas	Ehertucos Ehertucos	NIS NOS	PrefetOres PrefetOres PrefetOres	12 Shim 10 Shim 10 Shim	Sa Sa	Each Each	PALME C	20 0.7 20 0.7 20 0.7	6.7 6.7	1 1			9	0 8.39 0 7.83 0 8.09	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Suite diverting Tab Spood with the remodals shad off Showeshead (3.1). Suite diverting Tab Spood with the remodals shad off Showeshead (3.1). Suite diverting Tab Spood with the remodals shad off Showeshead (3.1).	gami (2006 Cade) - Gas sent (2006 Cade) - Gas sent (2006 Cade) - Gas	Sharucos Sharucos Sharucos	NS NOS NS NOS	PrefetOres PrefetOres PrefetOres	20 She 20 She 2 She	5	Each Each	PALME C PALME C	20 0.7 20 0.7 20 0.7	6.7 6.7 6.7				-	6 13.09 6 13.09	\$17.00 \$265.00 \$ \$17.00 \$265.00 \$
belor divertine Tab Secol with the recordate shall off Showerhead (L.). Sales diverting Tab Spool with the recordate shall off Showerhead (L.). Sales diverting Tab Spool with the recordate shall off Showerhead (L.).	conf. (2000 Code) -Sas gont (2000 Code) -Sas conf. (2000 Code) -Sas	Sharbook Sharbook	NS 808	Preferiouses Preferiouses Preferiouses	J Mrs. J Mrs.	is is	Sash Sash	PALME OF PALME OF	20 0.7 20 0.7 20 0.7	6.7 6.7					0 30.09 0 10.11	907.00 5265.00 5 907.00 5265.00 5
Suite diverting Tab Speed with the remarkation that off Showeshead (2.1). Suite diverting Tab Speed with the remarkation that off Showeshead (2.1). Suite diverting Tab Speed with the remarkation that off Showeshead (2.1).	gont (2000 Cale) -Cas gont (2000 Cale) -Cas gont (2000 Cale) -Cas	Ehe/GOS Ehe/GOS	NIS NOS	PrefetOres PrefetOres	S MFm 4 MFm 7 MFm	Es Es	Each Each	PALME C	20 0.7 20 0.7 20 0.7	6.7 6.7	1 1			9	0 10.98 0 5.17 0 5.00	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Suite diverting Tab Spood with the resordate chair off Showeshead (2.5) Suite diverting Tab Spood with the resordate chair off Showeshead (2.5)	gant (2006 Code) -Gas gant (2006 Code) -Gas	Sharketts Sharketts	NES 1008	Preferences Preferences	AMP III	1	Each Each	PALME C	20 0.7 20 0.7	0.7 0.7					0 AN 0 AN	\$17.00 \$265.00 \$ \$17.00 \$265.00 \$
bute divertine Tab lacod with the recordate shad off Showerhead (L.). Sales diverting Tab Spood with the recordate shad off Showerhead (L.). Sales diverting Tab Spood with the recordate shad off Showerhead (L.).	conf. (2000 Code) -Sas gont (2000 Code) -Sas conf. (2000 Code) -Sas	Shartsoon Shartsoon Shartsoon	NES NOS	Preferiores Preferiores Preferiores	12 MFm 12 MFm	1	Sash Sash	PALME O	20 0.7 20 0.7 20 0.7	6.7 6.7				-	0 8.87 0 9.38 0 8.77	907.00 5265.00 5 907.00 5265.00 5
Suite diverting Tab Speed with the remarkatic shad off Showeshead (2.1). Suite diverting Tab Speed with the remarkatic shad off Showeshead (2.1). Suite diverting Tab Speed with the remarkatic shad off Showeshead (2.1).	gont (2000 Cale) -Cas gont (2000 Cale) -Cas gont (2000 Cale) -Cas	Ehe/GOS Ehe/GOS	NES NOS	PrefetOres PrefetOres	10 MFm 10 MFm	Sa Sa	Each Each	PALME C	20 0.7 20 0.7 20 0.7	6.7 6.7	1 1			9	0 6.07 0 6.09 0 13.28	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Suite diverting Tab Spood with the remodals shad off Showeshead (2.1). Suite diverting Tab Spood with the remodals shad off Showeshead (2.1). Suite diverting Tab Spood with the remodals shad off Showeshead (2.1).	gami (2006 Cade) - Gas gami (2006 Cade) - Gas gami (2006 Cade) - Gas	Sharucos Sharucos Sharucos	NES NC	Prefered Prefered	2 She 2 She 3 She	See See	Each Each	PALM C	20 0.7 20 0.7	6.7 6.7 6.7	1			-	0 1013 0 104 0 108	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Suite diverting Tub Spool with the remodatic chair off Dissembered (2.5). Suite diverting Tub Spool with the remodatic chair off Dissembered (2.5). Suite diverting Tub Spool with the remodatic chair off Dissembered (2.5).	gon((2000 Code) = Gas gon((2000 Code) = Gas gon((2000 Code) = Gas	Shartucos Shartucos Shartucos	NES NC	Prefered Prefered	6 95m 5 95m 6 95m	See See	Each Each Each	PALSE C	30 07 30 07	6.7 6.7 6.7	1 1			0	0 8.61 0 9.30 0 8.21	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Suite diverting Tab Speed with the remodals that off Disserted (2.1). Suite diverting Tab Speed with the remodals that off Disserted (2.1). Suite diverting Tab Speed with the remodals that off Disserted (2.1).	gond (2006 Code) - Gas gond (2006 Code) - Gas gond (2006 Code) - Gas	Ehertucos Ehertucos	NES NC	Prefesor Prefesor Prefesor	2 She A She N She	See See	Each Each	PALME C	20 0.7 20 0.7 20 0.7	6.7 6.7	1 1			9	0 8.06 0 7.84 0 7.83	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Suite diverting Tab Spood with the resordation chair off Showeshead (2.5) Suite diverting Tab Spood with the resordation chair off Showeshead (2.5)	gant (2000 Code) -Gas gant (2000 Code) -Gas	Sharbook Sharbook	NES NC	Prefered Prefered	30 She 33 She 13 She	Sre	Each Each	PALME C	20 0.7 20 0.7	6.7 6.7					0 7.38 0 8.00	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
late director Tab laced with the recedition that off Dissertered (3.5). Solic directors Tab laced with the recedition that off Dissertered (3.5). Solic directors Tab laced with the recedition that off Dissertered (3.5).	cont (2000 Code) - Gas cont (2000 Code) - Gas cont (2000 Code) - Gas	Sharbook Sharbook	83 NC	Preferior Preferior	10 30m	Sex	Sech.	PALME C	20 0.7 20 0.7	67					6 7.83 6 8.09	907 00 5265 00 5 907.00 5265.00 P
Suite diverting Tab Spood with the recordatic chair off Showeshead (2.5) Suite diverting Tab Spood with the recordatic chair off Showeshead (2.5)	gont (2006 Code) =Gas gont (2006 Code) =Gas	Shafucos Shafucos	NES NC	Preferios Preferios	18 Shin 1 Saltina	See See	Each Each	PALME C	20 07 20 07	6.7				-	6 10.09 6 10.10	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Sales diversing Tals Speed with the remodals shall off Dissembed (3.5). Sales diversing Tals Speed with the remodals shall off Dissembed (3.5). Sales diversing Tals Speed with the remodals shall off Dissembed (3.5). Sales diversing Tals Speed with the seconds.	gant (2006 Code) - Gas gant (2006 Code) - Gas gant (2006 Code) - Gas gant (2006 Code)	Ehertucos Ehertucos	85 MC	Preference Preference Preference	SM-	10 10 10 10 10 10 10 10	Jack Land Land Land Land Land Land Land Land	PALME C	97 9 07 9 07	6.7 6.7				1	0 10.11 0 9.61	\$27.00 \$295.00 \$ \$27.00 \$295.00 \$
Bule direction 2nd Secolar With the remodals shall off Stonenhood (2.5). Bule direction 2nd Secolar With the remodals shall off Stonenhood (2.5). Bule direction 2nd Secolar With the remodals shall off Stonenhood (2.5). Bulle direction 2nd Secolar With the remodals.	cont (200 Code) - Gas good (200 Code) - Gas good (200 Code) - Gas	Sharbook Sharbook	83 NC 83 NC	Preferois Preferois Preferois	SMm SMm SMm SMm SMm SMm SMm DMm DMm DMm DMm	See See	Sach Sach	PALME C	97 9 07 9 07	6.7 6.7				-	E 9.37 E 9.50	97.00 \$26.00 S
Sales diversing Tals Speed with the remodals shall off Disamethead (2.5). Sales diversing Tals Speed with the remodals shall off Disamethead (2.5). Sales diversing Tals Speed with the remodals shall off Disamethead (2.5). Sales diversing Tals Speed with the seconds.	gant (2006 Code) - Gas gant (2006 Code) - Gas gant (2006 Code) - Gas	Ehertucos Ehertucos	NES NC	Preference Preference Preference	SM's SM's	See See	Each Each	PALSE C	9 07 2 07 2 07	6.7 6.7					0 8.70 0 8.70	\$17.00 \$391.00 \$ \$17.00 \$391.00 \$
Solve diverting Tab Speed with the remodals shall off Dissertined (2.5). Solve diverting Tab Speed with the remodals shall off Dissertined (2.5). Solve diverting Tab Speed with the remodals shall off Dissertined (2.5).	gond (2006 Coder) - Gas gond (2006 Coder) - Gas gond (2006 Coder) - Gas	Ehartucos Ehartucos	85 NC	Prefered Prefered	12 MFm	See See	Each Each	PALME C	2 07 2 07	6.7 6.7					0 9.38 0 8.37	507.00 \$295.00 \$ 507.00 \$295.00 \$
more whereing Tab Seniol with the emodalis shall off Dissert end (2.5). Solor diserting Tab Seniol with the emodalis shall off Dissert end (2.5). Solor diserting Tab Seniol with the emodalis shall off Dissert level (2.5).	eumi (2004 Coder) - Gas. eumi (2004 Coder) - Gas. epmi (2004 Coder) - Gas.	Sharbook Sharbook Sharbook	65 NC 85 NC 85 NC	Prefered Prefered	SMe SMe SMe	See See See	Sash Sash Sash	PALME C	H 07	6.7 6.7	П			-	0 9.67 0 9.69 0 15.28	97.00 \$265.00 \$ 97.00 \$265.00 \$ 97.00 \$265.00 \$
Laboratoring Sub Speed with the remodals shall off Dissembrad (3.5) Substituting Sub Speed with the remodals shall off Dissembrad (3.5) Substituting Sub Speed with the remodals shall off Dissembrad (3.5)	ay-1 (ann Cole) -Cas gant (2006 Cole) -Cas gant (2006 Cole) -Cas	Sharbook Sharbook	NIS NOS	renesci Prefesci Prefesci	2 She 3 She 3 She	Ē	Each Each	FRANK C	2 07 2 07 2 07	6.7 6.7 6.7	1			9	0 9.04 0 9.04	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Solve diverting Sub Speed with the remodals shall off Dissembred (3.5) Solve diverting Sub Speed with the remodals shall off Dissembred (3.5) Solve diverting Sub Speed with the remodals shall off Dissembred (3.5)	ayent (2006 Cedir) -Cas gond (2006 Cedir) -Cas gond (2006 Cedir) -Cas	Sharbook Sharbook	NIS NOS	renesci Prefesci Prefesci	d She S She S She	Ē	Each Each	PALME C	1 07 1 07	6.7 6.7 6.7				9	0 5.00 0 5.20	\$07.00 \$262.00 \$ \$07.00 \$262.00 \$
more overline Tab Secol with the resolute; shat off Showesheed CLS. Solic diverline Tab Secol with the resolute; shat off Showesheed CLS. Solic diverling Tab Speak with the resolute; shat off Showesheed CLS; shat of the Secolute Tab Speak with the resolute; shat off Showesheed CLS;	earn (2006 Calle) - Gas earn (2006 Calle) - Gas gan (2006 Calle) - Gas	Shartscop Shartscop Shartscop	HS 808	Prefesor Prefesor Prefesor	730m 830m 930m	-		FRANK C	8 87	6.7 6.7					d 2.86 0 7.86 0 7.83	97.90 \$35.90 5 97.90 \$35.90 5
Jerring car speed with the mordain shall off Dissentered (3.5). Indeed leveling Talk Speed, with the mordain shall off Dissentered (3.5). Indeed leveling Talk Speed, with the mordain shall off Dissentered (3.5).	gon((2006 Cale) - Gas gon((2006 Cale) - Gas gon((2006 Cale) - Gas	Ehartucos Ehartucos	NS NOS NS NOS	Prefered Prefered	12 Shin 12 Shin	En En En En	Each Each	FALSE C FALSE C FALSE C FALSE C	20 0.7 20 0.7 20 0.7 20 0.7 20 0.7 20 0.7 20 0.7	6.7 6.7					0 8.00 0 8.00	SET_00 S_2ES_00 S SET_00 S_2ES_00 S
Jerring car speed with the models shall off Dissentered (2.5). Solve Svering Tab Speed with the models shall off Shawestead (2.5). Solve Svering Tab Speed with the models shall off Shawestead (2.5).	goni (2006 Calir) -Cas goni (2006 Calir) -Cas goni (2006 Calir) -Cas	Shartucos Shartucos	NS NOS	Prefered Prefered	16 Shin 26 Shin 25 Shin	Ē	Each Each	PALES C	1 07 2 07	6.7 6.7					0 8.09 0 5.76	90.00 \$26.00 \$ 97.00 \$26.00 \$ 97.00 \$26.00 \$
into divertee Sal Send with the models that of Showesheel (S.S. Sale divertee Sal Send with the models that of Showesheel (S.S. Sale divertee Sal Send with the models that of Showesheel (S.S.	eart (2000 Cale) - Sas eart (2000 Cale) - Sas eart (2000 Cale) - Sas	Shafu035 Shafu035	NS NOS NS NOS	Preferior Preferior	1Mm 2Mm	-	Sech Sech	PALME C	1 07 1 07	6.7 6.7					0 13.80 0 10.09	57.90 \$25.90 \$ 57.90 \$25.90 \$
Substituting the Speed with the resolution shall off the westered (2.5). Substituting the Speed with the resolution shall off the westered (2.5). Substituting the Speed with the resolution shall off the westered (2.5).	goni (2000 cale) -Gas goni (2000 Cale) -Gas goni (2000 Cale) -Gas	Ehartucos Ehartucos	HIS HOS	Prefered Pre	SM'm SM'm	in in	Each Each	PALME C	9 07 2 07	6.7 6.7					0 548 0 1638	507.00 \$205.00 \$ 507.00 \$205.00 \$
Jerring car speed with the mordain shall off Dissentered (2.5). Solve Svering Tab Speed with the mordain shall off Dissentered (2.5). Solve Svering Tab Speed with the mordain shall off Dissentered (2.5).	ayent (2006 Calir) - Gas ayent (2006 Calir) - Gas ayent (2006 Calir) - Gas	Shartucos Shartucos	NS NOS	Prefered Prefered	2 Marin 2 Marin 3 Marin 4 Marin 5 Marin 5 Marin 2 Marin 10 Marin 1	Ē	Serin	F8432 C	2 07 2 07	6.7 6.7					0 637 0 630 0 830	901-00 \$295.00 \$ 907-00 \$295.00 \$
Suite direction Talk Second with the removable shad off Showeshead C.S. Suite direction Talk Second with the removable shad off Showeshead C.S. Suite directing Talk Spood with the removable shad off Showeshead C.S.	eard (2000 Cale) -Gas eard (2000 Cale) -Gas gord (2000 Cale) -Gas	She/GOS She/GOS She/GOS	NS NOS NS NOS	Preferior Preferior Preferior	20 MFm 12 MFm	in in	Sash Sash	PALME OF PALME O	20 0.7 20 0.7 20 0.7	6.7 6.7					6 8.70 6 8.87	907.00 \$265.00 \$ 907.00 \$265.00 \$
Suite diverting Tub Spood with the emuration chair off Dissertined (2.5). Suite diverting Tub Spood with the emuration chair off Dissertined (2.5). Suite diverting Tub Spood with the emuration chair off Dissertined (2.5).	gont (2006 Cale) -Cas gont (2006 Cale) -Cas	Shartucos Shartucos	NIS NOS	Prefesci Prefesci	10 MFm	ia ia	Each Each	PALME C	2 07 2 07	6.7					0 8.77 0 8.07	\$87.00 \$267.00 \$
Suite diverting Tub Spood with thermodatin shot off Showeshead (2.5) Suite diverting Tub Spood with thermodatin shot off Showeshead (2.5) Suite diverting Tub Spood with thermodatin shot off Showeshead (2.5)	gant (2006 Calir) = Gas gant (2006 Calir) = Gas gant (2006 Calir) = Gastris	Shartucos Shartucos	NIS NOS	PrefetOl PrefetOlers	10 MFm 10 MFm	10 10 10 10 10 10 10 10	Each Each	PALME C	20 07 20 07 20 07	6.7 6.7				0 0.02 2 M		\$17.00 \$267.00 \$ \$17.00 \$267.00 \$
Buto diverting Tub Spood with the emodatic shot off Showeshead (3.5). Buto diverting Tub Spood with the emodatic shot off Showeshead (3.5). Buto diverting Tub Spood with the emodatic shot off Showeshead (3.5).	pant (2000 cale) - Emirs sunt (2000 cale) - Emirs gant (2000 cale) - Emirs	Shartoos Shartoos	NES NC	Preferiouss Preferiouss Preferiouss	3 She 4 She	See	Sash Sash	PALME C	20 0.7 20 0.7 20 0.7	6.7 6.7				9,52 211 9,52 211 9,52 201	4 1	907.00 \$262.00 5 907.00 \$262.00 5
Substituting Tab Spool with the modals that off Diswerbead (2.5) Substituting Tab Spool with the modals that off Diswerbead (2.5) Substituting Tab Spool with the modals that off Diswerbead (2.5)	goni (2006 Cale) - Electric goni (2006 Cale) - Electric goni (2006 Cale) - Electric	Sharuos Sharuos	NIS NC	Prefesiones Prefesiones	6 She 2 She	See	Each Each	PALIS C	2 07 2 07	6.7				0.02 240 0.02 240	45 0 c16 0	\$87.00 \$267.00 \$
Substituting Tab Spool with thermodals shall off Showeshead (1.5) Substituting Tab Spool with thermodals shall off Showeshead (2.5) Substituting Tab Spool with thermodals shall off Showeshead (2.5)	gant (2000 cale) - Electric gant (2000 cale) - Electric gant (2000 cale) - Electric	Sharuos Sharuos Sharuos	NES NC	PrefetOres PrefetOres PrefetOres	2 She 20 She	See See	Each Each	PALME C	2 07 2 07 2 07	6.7 6.7				1	11 0 27 0 158 0	\$07.00 \$267.00 \$ \$02.00 \$267.00 \$
Solor Sverina Tab Sacod with thermodatic shall off Showeshead (3.5). Solor Sverina Tab Sacod with thermodatic shall off Showeshead (3.5). Solor Sverina Tab Sacod with thermodatic shall off Showeshead (3.5).	cont (2000 Cole) - Electric cont (2000 Cole) - Electric cont (2000 Cole) - Electric	Sharucos Sharucos Sharucos	983 NC	Prefetitions Prefetitions Prefetitions	12 She 12 She 13 She	See See	Sash Sash	PALME O PALME O	20 0.7 20 0.7 20 0.7	67 67 67				0.02 180 0.02 190 0.02 180	75 0 25 0	907 00 5265 00 5 907 00 5265 00 5
Suite directing Tab Spood with the resordatio chair off Showerhead (2.5) Suite directing Tab Spood with the resordatio chair off Showerhead (2.5) Suite directing Tab Spood with the resordatio chair off Showerhead (2.5)	gant (2006 Calir) - Electric gant (2006 Calir) - Electric gant (2006 Calir) - Electric	Sharboos Sharboos Sharboos	NES NC	Prefériciones Prefériciones Prefériciones	10 Pm 12 Pm 15 Pm 16 Pm 1 MPm 1 MPm	Sre Sre	Each Each	PALME C	20 0.7 20 0.7 20 0.7	6.7 6.7	1 1			0.02 180 0.03 134 0.02 281	88 0 189 0 181 0	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Suite directing Tab Spood with the encodate chair off Showerhead (2.5) Suite directing Tab Spood with the encodate chair off Showerhead (2.5) Suite directing Tab Spood with the encodate chair off Showerhead (2.5)	gand (2006 Code) - Electric gand (2006 Code) - Electric gand (2006 Code) - Electric	Sharucos Sharucos Sharucos	NES NC	Prefériciones Prefériciones Prefériciones	1 MFm 2 MFm 1 MFm	Sre Sre	Each Each	PALME C	20 0.7 20 0.7 20 0.7	6.7 6.7	1 1			0.01 241 0.02 211 0.02 231	56 0 158 0 162 0	\$17.00 \$267.00 \$ \$12.00 \$367.00 \$
Indic Sverine Tak Issuel with the resociatic shall off This webseld (L.). Indic Sverine Tak Issuel with the resociatic shall off This webseld (L.). Indic Sverine Tak Issuel with the resociatic shall off This webseld (L.).	cont (2000 Code) - Electric cont (2000 Code) - Electric cont (2000 Code) - Electric	Sharucos Sharucos Sharucos	983 NC	Prefetitions Prefetitions Prefetitions	SM'm SM'm	See See	Sash Sash	PALME O PALME O	20 0.7 20 0.7 20 0.7	67 67				0.02 230 0.02 240 0.02 230	48 0 111 0	907 00 \$295,00 S 907 00 \$295,00 S
Subsidizating Tub Spool with thermodulis shot off Showeshead (2.5) Subsidizating Tub Spool with thermodulis shot off Showeshead (2.5) Subsidizating Tub Spool with thermodulis shot off Showeshead (2.5)	gant (2006 Code) - Electric gant (2006 Code) - Electric gant (2006 Code) - Electric	Sharuos Sharuos Sharuos	NES NC	PrefetOres PrefetOres PrefetOres	A MFm 9 MFm	Sra Sra	Each Each	PALME C	2 07 2 07	6.7 6.7	1			0.02 200 0.02 200	14 0 163 0 163 0	\$07.00 \$262.00 \$ \$07.00 \$262.00 \$
Suite directing Tab Spood with the encodate chair off Showerhead (2.5) Suite directing Tab Spood with the encodate chair off Showerhead (2.5) Suite directing Tab Spood with the encodate chair off Showerhead (2.5)	gand (2006 Code) - Electric gand (2006 Code) - Electric gand (2006 Code) - Electric	Sharucos Sharucos Sharucos	NES NC	Prefériciones Prefériciones Prefériciones	12 MFm 12 MFm	Sre Sre	Each Each	PALME C	20 0.7 20 0.7 20 0.7	6.7 6.7	1 1			0.02 200 0.02 230	05 0 185 0 114 0	\$17.00 \$267.00 \$ \$17.00 \$267.00 \$
Suite diverting Tab Spood with the resourable chair off Shissenhead (3.5) Suite divertine Tab Second with the resourable chair off Shissenhead (3.5) Suite diverting Tab Spood with the resourable chair off Shissenhead (3.5)	gand (2006 Code) - Electric gand (2006 Code) - Electric gand (2006 Code) - Electric	Sharbook Sharbook Sharbook	NIS NC NIS NC	Prefetitions Prefetitions Prefetitions	10 MFm	See See	Each Each	PALME C PALME C	20 0.7 20 0.7 20 0.7	6.7 6.7 6.7				0.02 200 0.02 211 0.02 211	80 0 23 0	\$17.00 \$265.00 \$ \$17.00 \$265.00 \$
Suite directing Tub Spood with thermodatic chair off Shissenhead (2.5) Suite directing Tub Spood with thermodatic chair off Shissenhead (2.5) Suite directing Tub Spood with thermodatic chair off Shissenhead (2.5)	gani (2006 Code) - Electric gani (2006 Code) - Electric gani (2006 Code) - Electric	Sharuos Sharuos Sharuos	NIS NOS	PrefetOres PrefetOres PrefetOres	1 She 2 She	Sea Se	Each Each	PALME C	20 07 20 07 20 07	6.7	1			0.02 230 0.02 231	38 0 183 0 109 0	\$07.00 \$262.00 \$ \$07.00 \$262.00 \$
Suite directing Tab Spood with the encodatio chall off Shinaechead (2.5) Suite directing Tab Spood with the encodatio chall off Shinaechead (2.5) Suite directing Tab Spood with the encodatio chall off Shinaechead (2.5)	gand (2006 Code) - Electric gand (2006 Code) - Electric gand (2006 Code) - Electric	Sharucos Sharucos Sharucos	NIS NOS	Prefériciones Prefériciones Prefériciones	S Shee	in in	Each Each	PALME C PALME C	20 0.7 20 0.7 20 0.7	6.7 6.7	1 1			0.02 211 0.02 211	86 0 48 0 127 0	\$17.00 \$267.00 \$ \$17.00 \$267.00 \$
Date diverting Tab Speed with the emodatic chall off Dissertined (3.3). Bute divertine Tab Seed with the emodatic chall off Dissertined (3.3). Bute divertine Tab Seed with the emodatic chall off Dissertined (3.3).	gand (2006 Code) - Electric cond (2006 Code) - Electric cond (2006 Code) - Electric	Sharbook Sharbook Sharbook	NIS NOS NIS NOS	Preferious Preferious Preferious	4 She 7 She 8 She	5	Each Each	PALME C	20 0.7 20 0.7 20 0.7	6.7 6.7 6.7	1 1			0.02 340 0.02 340 0.02 340	45 0 116 0	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Suite diverting Tub Spood with the resolution shall off Showeshead (2.5) Suite diverting Tub Spood with the resolution shall off Showeshead (2.5) Suite diverting Tub Spood with the resolution shall off Showeshead (2.5)	gani (2006 Code) - Electric gani (2006 Code) - Electric gani (2006 Code) - Electric	Sharuos Sharuos Sharuos	NIS NOS	PrefetOoes PrefetOoes PrefetOoes	9 She 20 She 23 She	Es Es	Each Each	PALSE C	20 07 20 07 20 07	6.7 6.7	1 1			0.00 300 0.00 300 0.00 300 0.00 300 0.00 300 0.00 300	87 0 .58 0	\$17.00 \$267.00 \$ \$17.00 \$267.00 \$
Date diverting Tab Speed with the encodate that off Dissertined (3.5). Date diverting Tab Speed with the encodate that off Dissertined (3.5). Date diverting Tab Speed with the encodate that off Dissertined (3.5).	gand (2006 Code) - Electric gand (2006 Code) - Electric gand (2006 Code) - Electric	Sharbook Sharbook Sharbook	NIS NOS NIS NOS	Prefériciones Prefériciones Prefériciones	12 She 13 She 16 She	Sa Sa	Each Each	PALME C PALME C	20 07 20 07 20 07	6.7 6.7	1 1			0.02 140 0.02 140	95 0 :76 0	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Date diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting Tab Secol with the recolution shall off Disserting (L.S. Sales diverting the C.S. Sales diverting (L.S. Sales diverting the C.S. Sales diverting (L.S. Sales diverting the C.S. Sales diverting	eard (2000 Code) - Electric cond (2000 Code) - Electric cond (2000 Code) - Electric	Shafucos Shafucos Shafucos	NS NOS NS NOS	Preferidores Preferidores Preferidores	20 She 20 She 2 She	-	Sash Sash	PALME O	20 0.7 20 0.7 20 0.7	6.7 6.7				0.03 2M 0.02 2M 0.03 2M	.33 G	007 00 526,00 5 007 00 526,00 5
Suite diverting Tub Spood with the encodatio shall off Dissembred (3.5). Suite diverting Tub Spood with the encodatio shall off Dissembred (3.5). Suite diverting Tub Spood with the encodatio shall off Dissembred (3.5).	gani (2006 Code) - Electric gani (2006 Code) - Electric gani (2006 Code) - Electric	Sharbook Sharbook Sharbook	NIS NOS NIS NOS	Prefériciones Prefériciones Prefériciones	2 58m 3 58m 4 58m	Es Es	Each Each	FALSE C	10 07 20 07 20 07	6.7 6.7	1 1			0.02 2 H 0.02 2 H 0.02 2 H	58 0 (62 0 160 0	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Suite diverting Tab Speed with the remodals that off Disserted (2.1). Suite diverting Tab Speed with the remodals that off Disserted (2.1). Suite diverting Tab Speed with the remodals that off Disserted (2.1).	gant (2006 Code) - Electric gant (2006 Code) - Electric gant (2006 Code) - Electric	Sharucos Sharucos Sharucos	NIS NOS	PrefetOres PrefetOres	5 MF= 6 MF= 7 MF=	Sa Sa	Each Each	PALME C	20 0.7 20 0.7 20 0.7	6.7 6.7	1 1			0.02 210 0.02 210 0.02 210 0.02 230 0.02 230 0.02 230 0.02 230 0.02 230 0.02 230 0.02 230	.48 0 :11 0	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Suite diverting Tab Spood with the resordatio shad off Shissenhead (3.5). Suite divertine Tab Second with the resordatio shad off Shissenhead (3.5).	gant (2006 Code) - Electric cond (2006 Code) - Electric	Sharucos Sharucos	NS NOS	Preferiouss Preferiouss	1050m	5	Each Each	PALME C	20 0.7 20 0.7	67				0.02 200 0.02 200	40 0 40 0	\$17.00 \$265.00 \$ \$17.00 \$265.00 \$
Suite diverting Tab Speed with thermodatic shart off Dissertmed (2.1). Suite diverting Tab Speed with thermodatic shart off Dissertmed (2.1). Suite diverting Tab Speed with thermodatic shart off Dissertmed (2.1).	gon((2006 Code) - Electric gon((2006 Code) - Electric gon((2006 Code) - Electric	Sharbook Sharbook	NIS NOS	PrefetOres PrefetOres PrefetOres	12 MF= 12 MF=	ia ia	Each Each	PALSE C	20 07 20 07	6.7 6.7				0.02 200 0.02 200 0.02 200 0.02 200	.15 0 124 0	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
Suite diverting Tab Spood with thermodatic chair off Showeshead (2.5) Suite diverting Tab Spood with thermodatic chair off Showeshead (2.5)	gant (2006 Code) - Electric gant (2006 Code) - Electric	Sharucos Sharucos	NS 808	Preferiouss Preferiouss	10 MF=	Sa Sa	Each Each	PALIE C	20 0.7 20 0.7	6.7	1			0.02 313	.89 0 .89 0	\$17.00 \$265.00 \$ \$17.00 \$265.00 \$
Suite diverting Tab Speed with the resolution shall off Shimenhead (2.5). Suite diverting Tab Secol with the resolution shall off Shimenhead (2.5).	gant (2006 Code) - Electric cont (2006 Code) - Electric	Sharucos Sharucos	NES NC	Prefered Prefered	1 50m 2 50m	See	Sash Sash	PALME C	20 0.7 20 0.7	6.7 6.7				0.02 2M 0.02 211	.63 0 .03 0	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
but givening July Security for the Property of the State of Security (2.5). Such diverting Tub Spoul with the mortalist shart off Showethead (2.5). Such diverting Tub Spoul with the mortalist shart off Showethead (2.5).	gant (2006 Code) - Electric gant (2006 Code) - Electric gant (2006 Code) - Electric	Shart-008 Shart-008	NES NC	Prefered Prefered	6 She 5 She 6 She	See	Each Each	PALIS C	2 07 2 07	6.7 6.7				0.02 201 0.02 211	.48 0 17 0	907.00 5202.00 5 907.00 5202.00 5
Suite diverting Tab Spood with the encodatio chair off Dissue-thead (3.5). Suite diverting Tab Spood with the encodatio chair off Dissue-thead (3.5).	gant (2006 Code) - Electric gant (2006 Code) - Electric	Sharuos Sharuos	NES NC	Prefered Prefered	7 She A She	See See	Each Each	PALME C	20 0.7 20 0.7	6.7				0.02 180 0.02 180	114 0 111 0	\$17.00 \$262.00 \$ \$17.00 \$262.00 \$
bute diverting Tab Spool with the emeration chair off Dissertional (L.S. Buter diverting Tab Spool with the emeration chair off Dissertional (L.S. Buter diverting Tab Spool with the emeration chair off Dissertional (L.S.	gant (2006 Code) - Electric gant (2006 Code) - Electric	Sharucos Sharucos	NS NC	Preferior Preferior	20 Shm	See	Each Sach	PALME C	2 07 2 07	67				0.02 183 0.02 180	18 B	907 00 5.765 00 5 907 00 5.765 00 F
Substitution Tab Secul with the modules shall off Showeshead (3.5). Substitution Tab Secul with the modules shall off Showeshead (3.5). Substituting Tab Spool with the modules shall off Showeshead (3.5).	eard (2000 Code) - Destric eard (2000 Code) - Destric good (2000 Code) - Destric	Shartoos Shartoos	NES NC	Preferior Preferior Preferior	10 She 10 She 10 She	See	Sash Sash	PALME C PALME C	20 0.7 20 0.7 20 0.7	6.7 6.7				0.02 180 0.02 180	73 0 48 0	907.00 \$265.00 S 907.00 \$265.00 S
Solo diversing Tak Speed with the emodals shall off Dissectional (2.5). Solo diversing Tak Speed with the emodals shall off Dissectional (2.5). Solo diversing Tak Speed with the emodals shall off Dissectional (2.5).	gard (2000 Cody) - Electric gard (2000 Cody) - Electric gard (2000 Cody) - Electric	Ehartucos Ehartucos	NS NC	Prefered Pre	18 She 1 Min	See See	Each Each	PALME C	97 20 20 20 20 20 20 20 20 20 20 20 20 20	6.7 6.7				0.03 200 0.03 200	.13 0 .18 0	907.00 \$295.00 \$ 907.00 \$295.00 \$
wrong no speed with the models shall off Disperhead (3.5). Sales diverting Tab Speed with the models shall off Disperhead (3.5). Sales diverting Tab Speed with the models shall off Disperhead (3.5).	pp. 4 (Anna Calle) - Electric spent (2006 Calle) - Electric spent (2006 Calle) - Electric spent (2006 Calle) - Electric	Sharbook Sharbook	85 NC	Prefered Prefered	IMm IMm	See See	Sach Sach	PALME C	1 07 10 07	6.7 6.7				0.02 2 M 0.02 2 M	42 0 80 0	90 W 525.00 5 97.00 525.00 5 97.00 525.00 1
into diversing the Speed with the resolution that off Shapesheed (2.5). Substitute of the Speed with the resolution shall off Shapesheed (2.5). Substitute of Seeding 245. Speed with the resolution shall off Shapesheed (2.5).	guni (2006 cale) - Embris guni (2006 cale) - Embris guni (2006 cale) - Embris guni (2006 cale) - Embris	Sharbook Sharbook	HIS NC	Preferior Preferior	6 MFm 7 MFm	See See	Each Each	FALSE C	1 07 12 07	6.7 6.7				982 283 982 234 982 235	.11 0 126 0	901.00 \$295.00 \$ 907.00 \$295.00 \$ 907.00 \$295.00 \$
Sales diversing Tale Speed with the remodals shall off Shaweshead (2.5). Sales diversing Tale Speed with the remodals shall off Shaweshead (2.5). Sales diversing Tale Speed with the remodals shall off Shaweshead (2.5). Sales diversing Tale Speed with the remodals.	gant (2006 Code) - Embris gant (2006 Code) - Embris gant (2006 Code) - Embris gant (2006 Code)	Sharucos Sharucos Sharucos	NES NC	Preference Preference Preference	SM'm 20 M'm	See See	Each Each	PALSE C	9 07 2 07 2 07	6.7 6.7				0.02 200 0.02 200		\$17.00 \$391.00 \$ \$17.00 \$391.00 \$
Solve Service 2 his Secol with Democracy Shall off Disservine (1.5). Solve Service 2 his Secol with Democracy Shall off Disservine (1.5). Solve Service 2 his Secol with Democracy Shall only Service 2 his Secol with Secol	gant (2006 Code) - Electric gant (2006 Code) - Electric gant (2006 Code) - Electric gant (2006 Code)	Sharucos Sharucos Sharucos	85 MC	Preference Preference Preference	DMn DMn	See	Each Each	PALME C	97 9 07 9 07	6.7 6.7				0.02 200 0.02 200	16 0 (90 0	\$27.00 \$295.00 \$ \$27.00 \$295.00 \$
into diverting 7sh Sport with the morbidite shall off Disserbed (3.5). Sales diverting 7sh Sport with the morbidite shall off Disserbed (3.5). Sales diverting 7sh Sport with the morbidite shall off Disserbed (3.5). Sales diverting 7sh Sport with the morbidite shall off Disserbed (3.5).	gant (2006 Code) - Cincina gant (2006 Code) - Cincina gant (2006 Code) - Cincina	Ehartoos Ehartoos	NES NC	Preferior Preferior Preferior	15 MFm 16 MFm	See See	Each Each	F8438 C	H 07 H 07 H 07	6.7 6.7 0.7				0.02 311 0.01 241 0.02 1	38 0 38 0	\$17.00 \$291.00 \$ \$17.00 \$291.00 \$
into divering 7sh Spool with the module shall off Shameshead (2.5) Sales divering 7sh Spool with the emodule shall off Shameshead (2.5) Sales divering 7sh Spool with the emodule shall off Shameshead (2.5)	gant (2006 Code) - Electric gant (2006 Code) - Electric gant (2006 Code) - Electric	Sharucos Sharucos Sharucos	NES NOS NES NOS	Preference Preference Preference	2 Shin 3 Shin 6 Shin	Sa Sa	Each Each Each	FRANK C	2 07 2 07 2 0*	6.7 6.7 6.7				0.02 211 0.02 211 0.02 2**	00 0 ,86 0 L49 ^	\$17.00 \$312.00 \$ \$17.00 \$312.00 \$ \$17.00 \$312.00
Substitute of the State of the State of	gant (2004 Code) - Circles rand (2004 Code) - Circles rand (2004 Code) - Circles	Electrons Electrons Electrons	NS NOS NS NOS	Preferoi Preferoi	SSM SSM 755~	Sa Sa	Each Each	PALME C	2 07 2 07 2 07	6.7 6.7				0.02 211 0.02 241 0.02 241	22 0 45 0	\$17.00 \$295.00 \$ \$17.00 \$295.00 \$
inductiveting Tab Secol with the movidite, what off Dissectional (L.). Solor diverting Tab Speed with the emovidite what off Dissectional (L.). Solor diverting Tab Speed with the emovidite what off Dissectional (C.).	cont (2006 Code) - Circles gord (2006 Code) - Circles gord (2006 Code) - Circles	Sharbook Sharbook Sharbook	NIS NOS NIS NOS	Preferoi Preferoi	8 50m 9 50m 10 50m	Sa Sa	Each Each Each	PALME O	H 07	6.7 6.7				0.02 340 0.02 340 0.02 341	11 0 12 0	\$17.00 \$295.00 \$ \$17.00 \$295.00 \$
But of vering Tub Spool with the encodate shut off Down-head (2.5) Suite-divering Tub Spool with the encodate shut off Down-head (2.5) Suite-divering Tub Spool with the encodate shut off Down-head (2.5)	geni (2006 Cale) - Electric geni (2006 Cale) - Electric geni (2006 Cale) - Electric	Sharucos Sharucos Sharucos	NES NOS NES NOS	Prefesci Prefesci Prefesci	13 Shin 13 Shin 13 Shin	ila ila	Each Each Each	FRANK C	2 07 2 07 2 07	6.7 6.7 6.7				0.02 3 NO 0.02 3 NO	75 0 26 0	\$17.00 \$393.00 \$ \$17.00 \$393.00 \$ \$17.00 \$393.00
late divering Tab Speed with the module shall off Dissummed (2.5) late divering Tab Seed with the module shall off Dissummed (2.5) late divering Tab Seed with the module shall off Dissummed (2.5)	gard (2006 Cale) - Electric card (2006 Cale) - Electric card (2006 Cale) - Electric	Sharucos Sharucos Sharucos	NIS NOS NIS NOS	Prefesor Prefesor Prefesor	16/50m 25/50m 26/50m	in in	Sash Sash	FRANK C	2 07 2 07 2 0*	6.7 6.7 6.7				0.02 180 0.03 130 0.02 2***	H 0	\$2.00 \$342.00 \$ \$2.00 \$342.00 \$
indeed vertice 2 ob Second with the emericals what off the weetherd (2.5). Substituting 2 ob Speed with the emericals what off the weetherd (2.5). Substituting 2 ob Speed with the emericals what off the weetherd (2.5). Substituting 2 ob Speed with the emericals what off the weetherd (2.5).	cont (2000 Code) - Circles gord (2000 Code) - Circles gord (2000 Code) - Circles	Sharbook Sharbook Sharbook	NIS NOS	Preferoi Preferoi	1 MFm 2 MFm 3 MFm	Sa Sa	Each Each	FRANK C	2 07 2 07 2 07	6.7 6.7				0.01 261 0.02 211 0.02 210	55 0 158 0	\$17.00 \$295.00 \$ \$17.00 \$295.00 \$
into divering 7sh Spool with the modalis shall off Showeshead (2.5) Solor divering 7sh Spool with the modalis shall off Showeshead (2.5) Solor divering 7sh Spool with the modalis shall off Showeshead (2.5)	gant (2006 Code) - Cincina gant (2006 Code) - Cincina gant (2006 Code) - Cincina	Sharucos Sharucos Sharucos	NES NOS NES NOS	Preference Preference Preference	SMm SMm	Es Es	Each Each Each	FRANK C	2 07 2 07 2 0*	6.7 6.7 6.7				0.02 230 0.02 240 0.02 244	60 0 48 0	\$17.00 \$312.00 \$ \$17.00 \$312.00 \$ \$17.00 \$312.00
into divering 2sh Speed with the mortalis shall off Dissembrad (2.5) Sales divering 2sh Speed with the mortalis shall off Dissembrad (2.5) Soles divering 2sh Speed with the mortalis which the Dissembrad (2.5)	gand (2006 Code) - Chebra gand (2006 Code) - Chebra gand (2006 Code) - Chebra	Sharbook Sharbook Sharboom	NIS NOS	Prefered Prefered Prefered	ZMPm XMPm NAP-	in in	Each Each	FRANK C	2 07 2 07 2 07	6.7 6.7 0.7				0.02 230 0.02 200 0.02 7	18 0 183 0	\$17.00 \$295.00 \$ \$17.00 \$295.00 P
Suite diverting Tab Spend with the remodatic shall off Shower-head (3.5). Suite diverting Tab Spend with the remodatic shall off Shower-head (3.5), Suite diverting Tab Spend with the remodatic shall off Shower-head (3.5). Suite diverting Tab Spend with the remodatic shall not Shower-	gpm] (2006 Code) - Clerkin gpm] (2006 Code) - Clerkin gpm] (2006 Code) - Clerkin gpm] (2006 Code) - Clerkin	Ehartucos Ehartucos Ehartucos	NS NOS NS NOS	Prefered Prefered Prefered	10 Mm 10 Mm 10 Mm	En En	Each Each Each	F8438 C	2 07 2 07 2 07	6.7 6.7				0.02 200 0.02 200 0.02 200	05 0 135 0	\$17.00 \$392.00 \$ \$17.00 \$392.00 \$ \$17.00 \$392.00 \$
Luter diverting 7-b Speed with the resolution shall off Dissembraid (3.5). Safe diverting 7-b Speed with the resolution shall off Dissembraid (3.5). Solor diverting 7-b Speed with the resolution in the Dissembraid (3.5).	gami (2006 Code) - Electric gami (2006 Code) - Electric gami (2006 Code) - Electric	Sharbook Sharbook Sharboom	NIS NOS NIS NOS	Prefered Prefered Prefered	10 Mm 10 Mm 10 Mm	Sa Sa	Each Each	PALME C	2 07 2 07	6.7 6.7 0.7	1			0.02 200 0.02 211 0.02 ***	80 0 28 0	\$67.00 \$295.00 \$ \$67.00 \$295.00 P
Solo diversing Tab Spool with the encodain shall off Dissectional (2.5). Solo diversing Tab Spool with the encodain shall off Dissectional (2.5). Solo diversing Tab Spool with the encodain shall off Dissectional (2.5).	gant (2000 Code) - Circles gant (2000 Code) - Circles gant (2000 Code) - Cas	Ehartucco	HIS HOS	Prefered Pre	30 Min 3 Min	6	Each Each	PALM C	0.7 22 0.7 16 0.7	6.7 6.7	1 0	0 1613 8	52K.W 52K.W	0.01 261 0.01 261	33 G G 7.86	507.00 5265.00 5 507.00 5265.00 5
Into durries 3st less with the models shall off Downstead G.S. Suite durries 3st less d with the models shall off Downstead G.S. Suite durries 3st less d with the models shall off Downstead G.S.	emi (2006 Cale) - Gas gani (2006 Cale) - Gas gani (2006 Cale) - Gas	Ehartuder Ehartuder	803 IN 803 IN	Prefired Pre	Silter Silter Silter	Sa Sa	Each Each	TRUE C	97 9 07 9 07	6.7 6.7		0 12.66 S 0 12.66 S 0 12.64 S	120C 60 526C 80 526C 60 526C 80 526C 60 526C 80	1	6 640 6 647 6 647	\$200.61 \$290.00 \$ \$200.61 \$290.00 \$
	goni (2008 Cale) - Gas goni (2008 Cale) - Gas goni (2008 Cale) - Gas	Ehartudor Ehartudor	NA IR	Prefered Pre	6 She 2 She	in in	Each Each	THUS C	97 20 20 20 20 20 20 20 20 20 20 20 20 20	6.7 6.7	1 0	0 11.61 S 0 11.34 S	52K-99 52K-90 52K-99 52K-90	-	0 5.87 0 5.86	520.41 524.00 5 520.41 524.00 5
Sub-diverting Tab Spool with the emodatic shall off Dissentered (3.5) Sub-diverting Tab Spool with the emodatic shall off Dissentered (3.5) Sub-diverting Tab Spool with the emodatic shall off Dissentered (3.5) Sub-diverting Tab Spool with the emodatic shall off Dissentered (3.5) Sub-diverting Tab Spool with the emodatic shall off Dissentered (3.5)	community day	Ehartudor Ehartudor	NES DE	Prefered Prefered	0 She 20 She	-	Each Each	THUS C	97 97 98 97	6.7 6.7	1 0	0 30.50 S 0 30.50 S	52K M 52K M 52K M 52K M	-	6 130 6 141	520.41 524.00 5 520.41 524.00 5
but of verting 7.0 Egout with the reversion that off this we then if 1.1 but of verting 7.0 Egout with the reversion that off this we then if 1.3 but of verting 7.0 Egout with the reversion that off this we then if 1.3 but of verting 7.0 Egout with the reversion that off this we then if 1.3 but of verting 7.0 Egout with the reversion that off this vertine is 1.4 but of verting 7.0 Egout with the reversion that off this vertine is 1.4 but of vertine is 1.4 bu	gent (SSECale) -Cas	_mm_602	N3 IR N3 IR	Prefered Prefered Prefered	12 She 13 She 15 She prior	1	Sech Sech Sech	TRUE C	2 07 2 07	6.7 6.7	1 0	0 15.70 S 0 15.70 S	500 M 505 M 500 M 505 M	-	6 630 6 649	\$20.41 \$25.00 \$ \$20.41 \$26.00 \$
Sales developing the Speak with the removalue to the off Deverobeal (), I have developing the Speak with the removalue to their SD Deverobeal (), I have developing the Speak with the removalue to their SD Deverobeal (), I have developing the Speak with the removalue to their SD Deverobeal (), I have developing the Speak with the removalue to their SD Deverobeal (), I have developing the SD Deverobeal (), I have developing the SD Deverobeal (), I have developing the SD Deverobeal (), I have developed (), I ha	gent (2008 Celer) - Gas gent (2008 Celer) - Gas gent (2008 Celer) - Gas gent (2008 Celer) - Gas gent (2008 Celer) - Gas	Sharkson Sharkson	on SE	renesci Prefesci Prefesci	of She 25 She 26 She	Ē	Each Each	THUS C	2 07 2 07 2 07	6.7 6.7	1 0	0 8.01 S 0 16.07 S	200 M 200 M 200 M 200 M	9	6 439 6 7.81	520.42 524.00 5 520.42 524.00 5
In the Court of the Section of the Court of	gent (DEBCaler) - Gas gent (DEBCaler) - Gas	Sharkson Sharkson Sharkson Sharkson Sharkson	N1 18	Prefesci	JMm JMm JMm	Ē	Each Each	THUS C	1 07 2 07	6.7 6.7	1 0	u 16.77 5 0 16.07 5	50E.00 \$26E.00	- 9		, mm ma \$265.00 \$
The desirability of the position of the positi	green (2008-0009) - Oan green (2008-0009) - Oan green (2008-0009) - Sian green (2008-0009) - Oan green (2008-0009) - Oan	Sharkson Sharkson Sharkson Sharkson Sharkson Sharkson Sharkson Sharkson Sharkson	613 18 613 18 613 18	Prefired		6	Sech Sech	THUS C	# 07 # 07 # 07	6.7 6.7 6.7		0 1614 5	5245 M 5245 M	-	6 8.33 6 7.34 6 7.37	\$205.42 \$295.00 S
The state of the s	ger journalister van gere journalister van gere journaliste van gere jou	Eharfudor	NET 18 NET 18 NET 18 NET 18 NET 18 NET 18	PrefesOl PrefesOl PrefesOl PrefesOl	SM'm SM'm	in .					1 0	0 16.66 S 0 16.66 S 0 16.69 S 0 12.79 S	200'88 250'88 200'88 250'88 200'88 250'88		6 8.33 6 7.34 6 7.37 6 7.35 6 7.35 6 8.47	\$200.42 \$290.00 \$ \$200.42 \$290.00 \$ \$200.42 \$290.00 \$ \$200.42 \$290.00 \$
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		Sharikotti	No. No.	Profesion Profes	SMFm SMFm SMFm XMFm XMFm SMFm 10 MFm 11 MFm 12 MFm	En E	Each Each Each Each Each	THUS CO	20 0.7 20 0.7 20 0.7 20 0.7 20 0.7 20 0.7	6.7 6.7 6.7 6.7 6.7	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	0 16.54 S 0 15.65 S 0 16.99 S 0 12.78 S 0 12.78 S 0 12.23 S 0 12.23 S 0 12.23 S 0 12.23 S	\$200.00 \$200.0	1.00 1.	0 8.23 0 7.84 0 7.87 0 7.87 0 7.88 0 6.27 0 6.10 0 6.17 0 6.10 0 6.10 0 6.10 0 6.10 0 6.10	\$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$ \$200.40 \$290.00 \$
		Sharif-2022	Max	Profesion Profes	S Man S	En E	Each Each Each Each Each Each Each Each	THUS OF THUS O	2 07 2 07 2 07 2 07 2 07 2 07 2 07 2 07	6.7 6.7 6.7 6.7 6.7 6.7 6.7 6.7	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	0 16.14 S 0 16.65 S 0 16.67 S 0 12.79 S 0 12.79 S 0 12.33 S	SAC. 99 SPIL 90 SAC. 90 SPIL	0	0 8.33 0 7.36 0 7.35 2 7.65 6 7.35 0 6.54 0 6.53 0	TEXT 40 TEXT 60
		Desirioto Desiri	Mar.	Prefetal	Marin	Da D	Each Each Each Each Each Each Each Each	THUS CONTROL OF THUS CONTROL O	## 07 ## 07 ## 07 ## 07 ## 07 ## 07 ## 07 ## 07	6.7 6.7 6.7 6.7 6.7 6.7 6.7 6.7 6.7 6.7	1 0 1 0 1 0 1 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0	0 16.5.6.6 5 0 16.6.6 5 0 16.6.6 5 0 16.7.6 16.7.6 16.	Date of Cycle of Cy	0	6 8.32 6 7.86 6 7.87 6 7.87 6 6.87 6 6.87 6 6.37 6 6.37 6 6.32 6 7.32 6 7.32	TEXT 41 LYTL 60 TEXT 42 LYTL 60 TEXT 44 LYTL 60
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		Desirioto	Mar.	PrefetaG Pre	6 Mm. 6 Mm. 7 Mm. 8 Mm. 9 Mm. 9 Mm. 10 Mm. 1		Each Each Each Each Each Each Each Each	THA C	## 0.7 ## 0.7	63 63 63 63 63 63 63 63 63 63 63 63 63 6	1 0 0 1 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0	0 54.54 5 6 6 6 6 6 6 6 6 6	SEC. 00 SEC.	0	6 8.22 6 7.34 6 7.25 6 7.25 6 7.25 6 4.47 6 4.47 6 4.37 6 4.37 6 4.32 6 4.32 6 4.32 6 4.32 6 4.32 6 4.33 6 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	1002.41 174.00 1002.4
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		Despitoto Despit	1	Invertision Controlled	6 M m 6 M m 6 M m 7 M m 8 M m 8 M m 10 M		Each Each Each Each Each Each Each Each	THAI C TH	# 0.7 # 0.7	63 63 63 63 63 63 63 63 63 63 63 63 63 6	1	1	SEC.	0	6 A.20 6 7.36 6 7.36 6 7.36 6 7.36 6 4.47 6	1924.4 1924.6 1
		Despiration Despir	1	Intelligital Control of the Control	6 Mm 6 Mm 6 Mm 7 Mm 8 Mm 8 Mm 10 M		Lash Lash Lash Lash Lash Lash Lash Lash	THAI C TH	# 0.7 # 0.7	6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3	1	C	Section Sect	0	6 A.20 6 7.34 6 7.35 6 7.35 6 7.35 6 8.37 6 8.47 6	SECAL STATE
	100 100	Destriction	No. No.	Portfelioli, Christolia, Chris	6 M m 1 M m 2 M m 3 M m 3 M m 3 M m 3 M m 3 M m 3 M m 3 M m 3 M m 3 M m 3 M m 3 M m 3 M m 4 M m 4 M m 5		Labin	THE CONTROL OF THE CO	# 0.7 # 0.7	6.7 6.3 6.3 6.3 6.7 6.7 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3		1	Section Sect	0	6 A.20 6 7.26 6	100.00 1
		Despt.000	No. No.	Portfeliol (Portf	6 M m 6 M m 6 M m 6 M m 7 M m		sain Sain Sain Sain Sain Sain Sain Sain S	TRUE O TR	# 0.7 # 0.7	6.7 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3		Section Sect	Section Sect	0	6 A.20 6 7.26 6 7.26 6 7.26 6 7.26 6 0.27 6 0.40 6	March Marc
	100 100	Best	100 100	Portfeliolia Portf	6 M m 6		dation lands	TOLS 1 TOL	# 0.7 # 0.7	21		S	Section Sect	0	6 A.20 6 7.36 6	March Marc
	100 100					Section Sect		1900 1900			A	1 1 1 1 1 1 1 1 1 1	100 100	8	0 6.80 0 6.80 0 6.60 0 6.73	

Tub Spout Water Calculation



Water Gal to Energy Savings

Weet Suring 35 Water Suring M Water Living W M W W M W M W W M W M W M W M W M W	6.10 Therms/year	Cutum P C _s T _s T _s T _{ss}	Mayor State State of		Source S pal / fts 27 (mm / ft s 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1300 (130) Taid Shown Water Serings of Tail Sport Leafe- 1300 (40) (100 (100 (100 (100 (100 (100 (100 (1	### BIS MONEY ### DEST TOWNEY ### DEST	MFSpD MF Showers per Day - Showerhead = MFMDW / (TShNAUP + MFSb) = D.B.	ther Film humber lim by 2013 Film 24	1. Out enter represents Dis Implant Annu 1. West in the Option of State of	1867 - West remarkens axing though shade. ASS wavey data. 1868 - Resource of Efficiency (Title 20 gas - Gond residential water heaters).
2.0 griffmen 2.0	74.35 KM/year XX.36 KM/year 0.00 KM/year 0.01 KM/year	C2007 62.5 C2007 C2008 C2007 C2008 C2009 C2009	Amount IV		
C27	2E 140 170 333 277 333 277 335 180 340 181 331 182 331 282 140 277 240 383 440	CT2 98.7 CT2 CT3 43.8 CT3 CT3 43.8 CT3 CT4 43.8 CT3 CT5 4.8 CT5 CT5 4.8 CT5 CT5 CT5 CT5 Annual CT5	06 04 02 02 02 02 02 02 02 02 02 02 02 02 02		
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ED Water Consumption

105 105 105 Tank Tank Code	12.5 3.5 14 5 7.5	4.16 1.17 4.67 0 2.5	0 0 0 0	
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Code 23	# Bedrms	2.5	0	
23				
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DEER Assum	ptions			
Single-Family	Multi-Family			
25.0	20.8			
7.0	5.8			
28.0	23.3			
SCG/SDGE S	Survey			
86				
GE				
Single-Family	Multi-Family			
0.32	0.26			
	25.0 7.0 28.0 SCG/SDGE S 43 36 79 86 SE Single-Family 0.32	7.0 5.8 28.0 23.3 SCG/SDGE Survey 43 36 79 86 Single-Family Multi-Family	Single-Family Multi-Family 25.0 20.8 7.0 5.8 28.0 23.3 SCG/SDGE Survey 43 36 79 86 FE Single-Family Multi-Family 0.32 0.26	Single-Family Multi-Family 25.0 20.8 7.0 5.8 28.0 23.3 SCG/SDGE Survey 43 36 79 86 Fig. 10 86 Single-Family Multi-Family 0.32 0.26

Low Flow Showerheads Savings

Baseline Calculation			Adjusted SF Avg				MF Avg		Ratio MF 2.2				SF = Single F	
Baseline Flow rate Average shower time		2.25 7.4	2.25 7.4	2.20	1.80	2.50 7.4	2.25 7.4		2.20	1.80	gpm min		MF = Multi Fa	mily
Number of showers taken per day per household		2.79	2.79			2.22	2.22				Show ers/househo	old/day	Cold temp	See Weighted Averages
Throttling factor	0.9	0.9	0.9			0.9	0.9						er water temp	106
days/year	365	365	365			365	365				days/year		Hot temp	130
Number of showerheads per household Baseline Water consumption		2.01 7592	2.01 5086	4973	4069	1.50 6310	1.50 8095		5553	4544	show erhead/hous Gallons / show erh			
Mixed water daily use for shower	31.1	41.8	28.0			25.9	33.3	23.3			Gallons / househo			
Hot water daily use for shower	19.6	26.3	17.6			16.3	21.0	14.7						
Measure Calculation	SF 1.5 gpm	SF 1.6 gpm	Adjusted SF 1.6	SF 1.7 gpm	MF 1.5 gpm	MF 1.6 gpm	Adjusted MF 1.6	MF 1.7 gp	m					
Low Flow rate	1.5	1.6	1.6	1.7	1.5	1.6	1.6	1.7	gpm					
Average shower time Number of showers taken per day per household		7.4 2.79	7.4 2.79	7.4 2.79	7.4 2.22	7.4 2.22	7.4 2.22	7.4	min Showers/house	hold/day				
Throttling factor	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	-	Howay				
days/year Number of showerheads per household	365 2.01	365 2.01	365 2.01	365 2.01	365 1.50	365 1.50	365 1.50	365 1.50		uaahald				
Measure Water consumption		5399	3617	3843	3786	5756	4039		Gallons / show e					
Mixed water daily use for shower		29.7	19.9	21.2	15.6	23.7	16.6		Gallons / show	rerhead / day				
Hot water daily use for shower	11.8	18.7	12.5	13.3	9.8	14.9	10.5	11.1						
Annual Water Savings Summary		SF			MF									
2005	1.5 gpm	1.6 gpm 2035	1.7 gpm	1.5 gpm 2524	1.6 gpm	1.7 gpm								
3085 .5 gpm Baseline Ratio of 2.25 2570 2.25 gpm Baseline Avg	2261 1695	1469	1808 1243	1893	2272 1641		Gallons / show erhea Gallons / show erhea							
2.2 gpm Baseline Ratio of 2.25	1582	1356	1130	1767	1515	1262		Ĺ						
1.8 gpm Baseline Ratio of 2.25		452 show erhead per ye	226 ear	757	505	252								
	Water volume conversion	Water density @ 60°F	Cp of water	Cold water temperature	w ater temp @ show erhead	Water heater min. efficiency			SF					
	7.481	62.37	1.0	See Weighted Ave	106	0.77			CZ2010 Weat		ther files for 2013	3 Title-24)		
	gal / ft ³	lbm / ft ³	btu/lbm/°F	°F	° F	unitless		-		eighted Aver				
Th 0:	ee.			MF					CZ01	51.4				
Therms Saved Baseline Fed - 2.50 gpm	1.5 gpm	1.6 gpm	1.7 gpm	MF 1.5 gpm	1.6 gpm	1.7 gpm			CZ02 CZ03	57.2 57.0				
Базенне гей - 2.30 gpm	13.37	1.0 gpiii	10.7 gpm	1.5 gpiii	1.0 gpiii	11.9			CZ04	59.4				
2	11.94	10.7	9.6	13.3	12.0	10.7			CZ05	55.8				
3	11.99	10.8	9.6	13.4	12.0	10.7			CZ06	61.7				
4	11.40	10.3	9.1	12.7	11.5	10.2			CZ07	62.5				
5	12.29 10.84	11.1 9.8	9.8	13.7 12.1	12.3 10.9	11.0 9.7			CZ08 CZ09	63.7 63.7				
7	10.64	9.6	8.5	11.9	10.7	9.5			CZ10	64.0				
8	10.36	9.3	8.3	11.6	10.4	9.3			CZ11	62.8				
9	10.34	9.3	8.3	11.6	10.4	9.3			CZ12	60.7				
10		9.2	8.2	11.5	10.3	9.2			CZ13	63.8				
11	10.56 11.1	9.5 10.0	8.4 8.9	11.8 12.4	10.7 11.2	9.5 9.9			CZ14 CZ15	62.3 74.9				
13	10.3	9.3	8.3	11.6	10.4	9.3			CZ16	51.6				
14	10.7	9.6	8.6	12.0	10.8	9.6								
15	7.6	6.8 12.0	6.1 10.7	8.6 14.9	7.7 13.4	6.9 11.9			MF C72010 West	her Files (wes	ther files for 2013	3 Title-24)		
Baseline SCG - 2.25 gpm		1.6 gpm	1.7 gpm	1.5 gpm	1.6 gpm	1.7 gpm				eighted Aver		7 110-24)		
1	10.0	8.7	7.4	11.2	9.7	8.2			CZ01	51.4				
2	9.0	7.8	6.6	10.0	8.7	7.3			CZ02	57.2				
3	9.0	7.8	6.6	10.0	8.7	7.4			CZ03	57.0				
4	8.5	7.4	6.3	9.5	8.3	7.0			CZ04	59.4				
5	9.2	8.0 7.0	6.8	10.3 9.1	8.9 7.9	7.5 6.7			CZ05 CZ06	55.8				
7	8.0	6.9	5.9	8.9	7.7	6.5			CZ07	61.7 62.5				
. 8	7.8	6.7	5.7	8.7	7.5	6.4			CZ08	63.7				
9	7.8	6.7	5.7	8.7	7.5	6.4			CZ09	63.7				
10		6.7	5.6	8.6	7.5	6.3			CZ10	64.0				
11	7.9	6.9	5.8	8.9	7.7	6.5			CZ11	62.7				
12		7.2	6.1 5.7	9.3	8.1	6.8			CZ12 CZ13	60.6				
13		6.7	5.7	8.7 9.0	7.5 7.8	6.4			CZ13	63.6 62.1				
15		4.9	4.2	6.4	5.6	4.7			CZ15	74.6				
16	10.0	8.7	7.3	11.2	9.7	8.2			CZ16	51.5				
Baseline SCG - 2.2 gpm	1.5 gpm	1.6 gpm	1.7 gpm	1.5 gpm	1.6 gpm	1.7 gpm								
1	9.4	8.0	6.7	10.5	9.0	7.5								
2	8.4	7.2	6.0	9.3	8.0	6.7								
3	8.4 8.0	7.2 6.8	6.0 5.7	9.4 8.9	8.0 7.6	6.7 6.4								
5	8.6	7.4	6.1	9.6	8.2	6.9								
6	7.6	6.5	5.4	8.5	7.3	6.1								
7	7.5	6.4	5.3	8.3	7.1	5.9								
8	7.3	6.2	5.2	8.1	6.9	5.8								
9	7.2	6.2	5.2	8.1	6.9	5.8								
10	7.2 7.4	6.2	5.1 5.3	8.0 8.3	6.9 7.1	5.7 5.9								
11		6.6	5.5	8.7	7.4	6.2								
13		6.2	5.2	8.1	7.0	5.8								
14	7.5	6.4	5.3	8.4	7.2	6.0								
15		4.6	3.8	6.0	5.1	4.3								
16	9.3	8.0	6.7	10.4	8.9	7.4								
Baseline SCG - 1.8 gpm	1.5 gpm 4.0	1.6 gpm 2.7	1.7 gpm 1.3	1.5 gpm 4.5	1.6 gpm 3.0	1.7 gpm 1.5		-						
1	3.6	2.1	1.3	4.5	2.7	1.3								
3	3.6	2.4	1.2	4.0	2.7	1.3								
4	3.4		1.1	3.8	2.5	1.3								
5	3.7	2.5	1.2	4.1	2.7	1.4								
6	3.3	2.2	1.1	3.6	2.4	1.2								
7	3.2	2.1	1.1	3.6	2.4	1.2		-						
8	3.1	2.1	1.0	3.5 3.5	2.3	1.2								
10	3.1	2.1	1.0	3.5	2.3	1.1								
11	3.1	2.1	1.1	3.4	2.4	1.1								
12	3.3	2.2	1.1	3.7	2.5	1.2								
13	3.1	2.1	1.0	3.5	2.3	1.2								
14	3.2	2.1	1.1	3.6	2.4	1.2								
15		1.5	0.8	2.6	1.7	0.9								
16	Unit = therms/year		1.3	4.5	3.0	1.5		-						
										1				

Mixed Daily Water Calculator

Baseline Calculation	SF Code	SF Avg	Adjusted SF Avg	MF Code	MF Avg	Adjusted MF Avg			SF = Single Fami	ly
Baseline Flow rate	2.50	2.25	2.25	2.50	2.25	2.25	gpm		MF = Multi Family	
Average shower time	7.4	7.4	7.4	7.4	7.4	7.4	min			
taken per day per household	2.79	2.79	2.79	2.22	2.22	2.22	Show ers/household/	day	Cold temp	65
Throttling factor	0.9	0.9	0.9	0.9	0.9	0.9	-	Sh	owerwatertemp	106
			365			365	days/year		Hot temp	130
			2.01			1.50	show erhead/househ	old		
			5086	8994	8095					
			28.0	37.0	33.3		Gallons / household /	day		
Hot water daily use for shower	29.3	26.3	17.6	23.3	21.0	14.7				
Moscure Calculation	CE 1 E anm	SE 1 6 apm	Adjusted SE 1.6	SE 1.7 apm	ME 1 F apm	ME 1.6 gpm	Adjusted ME 1.6	ME 17 an	m	
	- 01		•	•			,	0.		
										nold/day
			0.9				0.9			
			365	365	365	365	365			
		2.01	2.01	2.01	1.50	1.50	1.50			usehold
asure Water consumption	3391	5399	3617	3843	3786	5756	4039	4291	Gallons / show e	rhead / year
Mixed water daily use for shower	18.7	29.7	19.9	21.2	15.6	23.7	16.6	17.6	Gallons / show	erhead / day
Hot water daily use for shower	11.8	18.7	12.5	13.3	9.8	14.9	10.5	11.1		
		1								
			•							
		_								
	(GPM)	(Gal/day)	(Gal/day)	Volume(Gal)	Volume(Gal)					
	2.50	31.12	25.93	5652	6310					
	2.25	28.01	23.34	5086	5679					
	2.00	24.90	20.75	4521	5048					
	1.80	22.41	18.67	4069	4544					
	1.70	21.16		3843	4291					
	_									
	1.00	12.45	10.57	2201	2524					
	Baseline Flow rate Average shower time taken per day per household Throttling factor days/year showerheads per household seline Water consumption Mixed water daily use for shower Hot water daily use for shower Measure Calculation Low Flow rate Average shower time taken per day per household Throttling factor days/year showerheads per household asure Water consumption Mixed water daily use for shower	Average shower time taken per day per household 2.76 Throttling factor 0.9 days/year 365 showerheads per household 2.01 seline Water consumption Mixed water daily use for show er 46.5 Hot water daily use for show er 29.3 Measure Calculation Low Flow rate Average shower time 7.4 taken per day per household 2.79 Throttling factor 0.9 showerheads per household 2.01 assure Water consumption Mixed water daily use for show er 18.7 Hot water daily use for show er 11.8 flow rate (GPM) 2.50 2.25 2.00 1.80	Baseline Flow rate	Baseline Flow rate	Baseline Flow rate 2.50 2.25 2.25 2.50 Average shower time 7.4 7.4 7.4 7.4 7.4 7.4 7.4 Throttling factor 0.9 0.9 0.9 0.9 0.9 0.9 0.9 Gays/year 365 3	Baseline Flow rate	Baseline Flow rate	Baseline Flow rate	Baseline Flow rate	Baseline Flow rate

SF Weather Data

CZ2010 V	Veather File	s (weathe	r files for 2	2013 Title-2	24)										
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	Weighted Average	
CZ01	49.5	48.7	48.6	49.0	50.5	52.0	53.2	54.0	54.1	53.4	52.2	50.8	51.4	51.4	0.0
CZ02	53.7	52.3	52.1	52.8	55.6	58.4	60.8	62.3	62.5	61.2	58.9	56.2	57.3	57.2	0.1
CZ03	54.5	53.4	53.3	53.8	55.8	57.8	59.6	60.7	60.8	59.9	58.2	56.2	57.1	57.0	0.0
CZ04	55.7	54.1	54.0	54.8	57.7	60.7	63.3	64.9	65.0	63.7	61.2	58.3	59.5	59.4	0.1
CZ05	53.6	52.7	52.7	53.1	54.8	56.5	58.0	58.9	59.0	58.2	56.8	55.1	55.8	55.8	0.0
CZ06	58.9	57.8	57.7	58.2	60.4	62.6	64.5	65.7	65.8	64.9	63.0	60.9	61.8	61.7	0.0
CZ07	60.2	59.3	59.2	59.7	61.5	63.2	64.8	65.8	65.9	65.1	63.5	61.8	62.6	62.5	0.0
CZ08	60.7	59.5	59.4	59.9	62.3	64.7	66.7	68.0	68.1	67.0	65.1	62.8	63.7	63.7	0.1
CZ09	60.2	58.7	58.6	59.3	62.1	64.9	67.4	68.9	69.1	67.8	65.4	62.7	63.8	63.7	0.1
CZ10	59.9	58.2	58.0	58.9	62.2	65.5	68.3	70.1	70.3	68.8	66.0	62.8	64.1	64.0	0.1
CZ11	55.8	52.8	52.6	54.0	59.8	65.5	70.5	73.6	73.9	71.3	66.5	60.9	63.2	62.8	0.3
CZ12	55.6	53.5	53.3	54.3	58.4	62.5	66.1	68.3	68.5	66.7	63.2	59.3	60.9	60.7	0.2
CZ13	57.0	54.0	53.8	55.2	60.8	66.3	71.1	74.2	74.5	72.0	67.3	61.9	64.1	63.8	0.3
CZ14	55.2	52.2	51.9	53.4	59.2	65.0	70.0	73.2	73.5	70.9	66.0	60.4	62.7	62.3	0.3
CZ15	68.4	65.5	65.3	66.6	72.2	77.7	82.4	85.5	85.7	83.3	78.6	73.3	75.5	74.9	0.5
CZ16	45.3	42.7	42.4	43.7	48.7	53.8	58.1	60.9	61.1	58.9	54.6	49.8	51.8	51.6	0.2

MF Weather Data

CZ2010 V	Veather File	s (weathe	r files for 2	013 Title-2	4)									
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	Weighted Average
CZ01	49.5	48.7	48.6	49.0	50.5	52.0	53.2	54.0	54.1	53.4	52.2	50.8	51.4	51.4
CZ02	53.7	52.3	52.1	52.8	55.6	58.4	60.8	62.3	62.5	61.2	58.9	56.2	57.3	57.2
CZ03	54.5	53.4	53.3	53.8	55.8	57.8	59.6	60.7	60.8	59.9	58.2	56.2	57.1	57.0
CZ04	55.7	54.1	54.0	54.8	57.7	60.7	63.3	64.9	65.0	63.7	61.2	58.3	59.5	59.4
CZ05	53.6	52.7	52.7	53.1	54.8	56.5	58.0	58.9	59.0	58.2	56.8	55.1	55.8	55.8
CZ06	58.9	57.8	57.7	58.2	60.4	62.6	64.5	65.7	65.8	64.9	63.0	60.9	61.8	61.7
CZ07	60.2	59.3	59.2	59.7	61.5	63.2	64.8	65.8	65.9	65.1	63.5	61.8	62.6	62.5
CZ08	60.7	59.5	59.4	59.9	62.3	64.7	66.7	68.0	68.1	67.0	65.1	62.8	63.7	63.7
CZ09	60.2	58.7	58.6	59.3	62.1	64.9	67.4	68.9	69.1	67.8	65.4	62.7	63.8	63.7
CZ10	59.9	58.2	58.0	58.9	62.2	65.5	68.3	70.1	70.3	68.8	66.0	62.8	64.1	64.0
CZ11	55.8	52.8	52.6	54.0	59.8	65.5	70.5	73.6	73.9	71.3	66.5	60.9	63.2	62.7
CZ12	55.6	53.5	53.3	54.3	58.4	62.5	66.1	68.3	68.5	66.7	63.2	59.3	60.9	60.6
CZ13	57.0	54.0	53.8	55.2	60.8	66.3	71.1	74.2	74.5	72.0	67.3	61.9	64.1	63.6
CZ14	55.2	52.2	51.9	53.4	59.2	65.0	70.0	73.2	73.5	70.9	66.0	60.4	62.7	62.1
CZ15	68.4	65.5	65.3	66.6	72.2	77.7	82.4	85.5	85.7	83.3	78.6	73.3	75.5	74.6
CZ16	45.3	42.7	42.4	43.7	48.7	53.8	58.1	60.9	61.1	58.9	54.6	49.8	51.8	51.5

Tub Spout and Showerhead Cost Data

(Attachment B to Workpaper SWWH001v00)

				f valve		
omr	nendations for 2016 Workpaper					
	Base Case Cost					
	Measure Code	Product Description	Equipment Cost	Labor/ Installation Cost	Maintenance/ Other Cost	Total Base Case Cos
	ShwFLr005, ShwFLr006	2.0 GPM Showerhead	\$ 38.62	\$ 15.67	,	\$ 54.29
	ShwFLr007, ShwFLr008	1.8 GPM Showerhead	\$ 41.23	\$ 15.67	,	\$ 56.93
	ShwFLr005, ShwFLr006, ShwFLr007, ShwFLr008	5.0 GPM Tub Spout with Diverter	\$ 28.03	\$ 15.67	,	\$ 43.70
	ShwFLr005, ShwFLr006	Showerhead and Tub Spout with Diverter	\$ 66.65	\$ 31.34	ı	\$ 97.99
	ShwFLr007, ShwFLr008	Showerhead and Tub Spout with Diverter	\$ 69.27	\$ 31.34		\$ 100.63
	*assuming same cost for tub spou	ut installation as sho	werhead installatio	on		
	Measure Case Cost					
	Measure Code	Product Description	Equipment Cost	Labor/ Installation Cost	Maintenance/	Total Base Case Cos
	ShwFLr005, ShwFLr006, ShwFLr007, ShwFLr008	ADTS w/single- function 1.5 gpm Showerhead & All Quick Connect Mounts	\$ 119.99	\$ 72.00		\$ 191.99
	Incremental Measure Cost					
	Measure Code	Installation Type	Incremental	Full Measure Co		
		mistaliation Type	Measure Cost	1 st Baseline	2 nd Baseline	
	ShwFLr005, ShwFLr006,	ROB/NC	\$ 94.00	\$ 94.00		
	ShwFLr007, ShwFLr008	ER	\$ 91.38	\$ 191.99	\$ 91.38	

Auto-div	verting Tub Spo	out w	ith therm	ostatic	shut-of	f valve
From discu	ssions with contractor	s and	manufacture			
N	Measure Code	Units	Material Cost	Labor Cost	Total Cost	Source
9	ShwFLr005, ShwFLr006, ShwFLr007, ShwFLr008	Each	\$ 119.99	\$ 72.00	\$ 191.99	http://thinkevolve.com/shop/tub-spout-system-showerhead/
*	Updated 3/31/2016					
	*Full cost table from ma	nufactı	urer is available	e upon reque	est	

2016 TS W Diverter Pivot Table

	Colun	nn Labels 🔼		
Row Labels	▼	Jan-00	Gra	and Total
Base				
Average of Price per unit	\$	28.03	\$	28.03
Count of Model		33		33
Total Average of Price per uni	it \$	28.03	\$	28.03
Total Count of Model		33		33

2016 TS W Diverter Database

							Price per			
Manufacturer	Series	Model	-	GPM	Category	7	unit 🔽	Source	Comments	-
Deleted	Deleted	E531D-1F			Base	\$	8.91	http://www.homedepot.com/		
Deleted	Deleted	RP17453			Base	\$	21.14	http://www.homedepot.com/		
Deleted	Deleted	972-362PK2			5 Base	\$	30.40	http://www.homedepot.com/		
Deleted	Deleted	RP5836			Base	\$	20.77	http://www.homedepot.com/		
Deleted	Deleted	RP34357RB			Base	\$	51.66	http://www.homedepot.com/		
Deleted	Deleted	K-10281-4-CP			Base	\$		http://www.homedepot.com/		
Deleted	Deleted	179101			Base	\$	62.00	http://www.homedepot.com/		
Deleted	Deleted	RP5834			Base	\$	23.95	http://www.homedepot.com/		
Deleted	Deleted	RP17454PB			Base	\$	67.17	http://www.homedepot.com/		
Deleted	Deleted	9D0034230X			Base	\$				
Deleted	Deleted	10319			Base Base	\$	27.98	http://www.homedepot.com/		
Deleted	Deleted	58253				\$		http://www.homedepot.com/		
Deleted	Deleted	10766			Base	\$		http://www.homedepot.com/		
Deleted	Deleted	K-10280-4-CP			Base	\$		http://www.homedepot.com/		
Deleted	Deleted	RP17453SS			Base	\$	47.51	http://www.homedepot.com/		
Deleted	Deleted	022635-0020A			Base	\$	14.95	http://www.homedepot.com/		
Deleted	Deleted	K-10281-4A-CP			Base	\$	27.41	http://www.homedepot.com/		
Deleted	Deleted	RP5834			Base	\$		http://www.lowes.com/		
Deleted	Deleted	88052		;	Base	\$	12.99	http://www.lowes.com/		
Deleted	Deleted	SW2103			Base	\$		http://www.lowes.com/		
Deleted	Deleted	88703X		;	Base	\$	16.99	http://www.lowes.com/		
Deleted	Deleted	RP72565RB		;	Base	\$		http://www.lowes.com/		
Deleted	Deleted	80765		;	Base	\$	11.48	http://www.lowes.com/		
Deleted	Deleted	15136-PB			Base	\$		http://www.lowes.com/		
Deleted	Deleted	10281-4-BN		;	Base	\$	39.68	http://www.lowes.com/		
Deleted	Deleted	8888730.224			Base	\$	37.54	http://www.lowes.com/		
Deleted	Deleted	SWD0205 D			Base	\$	29.99	http://www.lowes.com/		
Deleted	Deleted	SWD0422 D			Base	\$		http://www.lowes.com/		
Deleted	Deleted	10317		;	Base	\$	27.99	http://www.lowes.com/		
Deleted	Deleted	89249			Base	\$		http://www.lowes.com/		
Deleted	Deleted	185-S-CP			Base	\$	32.03	http://www.lowes.com/		
Deleted	Deleted	10316			Base	\$	24.99	http://www.lowes.com/		
Deleted	Deleted	SW2101		;	Base	\$	18.98	http://www.lowes.com/		

2016 Showerhead Pivot Table

	Colu	ımn Labels 💌			
Row Labels	▼	2	1.75	Gra	and Total
Code 2016					
Average of Price per unit	\$	38.62		\$	38.62
Count of Model		35			35
Code 2018					
Average of Price per unit			\$41.23	\$	41.23
Count of Model			14		14
Total Average of Price per un	nit \$	38.62	\$41.23	\$	39.36
Total Count of Model		35	14		49

2016 Showerhead Database

						Dries ner		
Manufacturer _	Series *	Model	GPM	Category	v	Price per unit	Source	Comments
Deleted	Deleted	TAV-529T	Grivi	2 Code 2016	- g	41111	http://www.homedepot.com/	Comments
Deleted	Deleted	75356SN		2 Code 2016	79		http://www.homedepot.com/	
Deleted	Deleted	015-WSTD2C		2 Code 2016	7 9		http://www.homedepot.com/	
Deleted	Deleted	23045		2 Code 2016	- 9		http://www.homedepot.com/	
Deleted	Deleted	ASW-673T		2 Code 2016	7 9		http://www.homedepot.com/	
Deleted	Deleted	75554		2 Code 2016	-9		http://www.homedepot.com/	
Deleted	Deleted	015-WSTD3K		2 Code 2016	• 9		http://www.homedepot.com/	
Deleted	Deleted	SM-623CGT		2 Code 2016	-9		http://www.homedepot.com/	
Deleted	Deleted	58208-0101	_	2 Code 2016	7.9	36.73	http://www.homedepot.com/	
Deleted	Deleted	21530		2 Code 2016	-9	49.98	http://www.homedepot.com/	
Deleted	Deleted	YAT-933T		2 Code 2016	• 9	27.28	http://www.homedepot.com/	
Deleted	Deleted	75357OB		2 Code 2016	9	41.98	http://www.homedepot.com/	
Deleted	Deleted	75174		2 Code 2016	• 9	47.23	http://www.homedepot.com/	
Deleted	Deleted	ASK-733T		2 Code 2016	9	36.73	http://www.homedepot.com/	
Deleted	Deleted	K-R75563-BN		2 Code 2016	9	36.73	http://www.homedepot.com/	
Deleted	Deleted	TAV-523T		2 Code 2016	9		http://www.homedepot.com/	
Deleted	Deleted	75251		2 Code 2016	9		http://www.homedepot.com/	
					9			
Deleted	Deleted	26313SRN		2 Code 2016			http://www.homedepot.com/	
Deleted	Deleted	015-WSVNKK		2 Code 2016	\$		http://www.homedepot.com/	
Deleted	Deleted	43268		2 Code 2016	\$	59.98	http://www.lowes.com/	
Deleted	Deleted	81568		2 Code 2016	9	29.98	http://www.lowes.com/	
Deleted	Deleted	75569		2 Code 2016	9	34.98	http://www.lowes.com/	
Deleted	Deleted	1660.717.002	_	2 Code 2016	79	36 44	http://www.lowes.com/	
Deleted	Deleted	75569SN		2 Code 2016	9		http://www.lowes.com/	
					9		· 	
Deleted	Deleted	S-2252-E2-BP		2 Code 2016			http://www.lowes.com/	
Deleted	Deleted	49267		2 Code 2016	9		http://www.lowes.com/	
Deleted	Deleted	D460047RB		2 Code 2016	\$		http://www.lowes.com/	
Deleted	Deleted	75762SN		2 Code 2016	9	29.98	http://www.lowes.com/	
Deleted	Deleted	R14519-CP		2 Code 2016	- 9	38.98	http://www.lowes.com/	
Deleted	Deleted	D460029BR		2 Code 2016	9	51.17	http://www.lowes.com/	
Deleted	Deleted	S-2007-BN-E2		2 Code 2016	9		http://www.lowes.com/	
Deleted	Deleted	D460047BN	1	2 Code 2016	19			
					_			
Deleted	Deleted	DK131A5		2 Code 2016	\$		http://www.lowes.com/	
Deleted	Deleted	52634-SS20-PK		2 Code 2016	\$		http://www.lowes.com/	
Deleted	Deleted	72425-CP		2 Code 2016	\$		http://www.lowes.com/	
Deleted	Deleted	6307EPORB		1.75 Code 2018	9		http://www.homedepot.com/	
Deleted	Deleted	6303EPORB		1.75 Code 2018	\$		http://www.homedepot.com/	
Deleted	Deleted	6303EP		1.75 Code 2018	9		http://www.homedepot.com/	
Deleted	Deleted	6300EP		1.75 Code 2018	\$		http://www.homedepot.com/	
Deleted	Deleted	Mar-4	-	1.75 Code 2018	9		http://www.homedepot.com/	
Deleted	Deleted	***************************************	#	1.75 Code 2018	9		http://www.homedepot.com/	
Deleted	Deleted	A501ORB	1	1.75 Code 2018	9		http://www.lowes.com/	
Deleted	Deleted	May-4	4	1.75 Code 2018	9		http://www.lowes.com/	
Deleted	Deleted	A501CG	2	1.75 Code 2018	9		http://www.lowes.com/	
Deleted	Deleted	Nov-6	-	1.75 Code 2018			http://www.lowes.com/	
Deleted Deleted	Deleted	6300EP Mar-2	1	1.75 Code 2018 1.75 Code 2018	9		http://www.lowes.com/	
Deleted	Deleted Deleted	6304EP		1.75 Code 2018 1.75 Code 2018	79		http://www.lowes.com/	
Deleted	Deleted	D460057BN		1.75 Code 2018 1.75 Code 2018	79		http://www.lowes.com/	
Deleten	Deleted	D400007 DIN		1.73 COUR 2010	4	44.39	http://www.iowes.com/	

MCS Results Matrix

Measure	READI Index ID	Cost Unit	Cost Type		Sample			Analysis			Results Benchmarks		Supporting Docs/Notes
Commercial Refrigeration (Superma	arkets)					Min Price Ma					DEER05 DEER01		
ECM fan motors for walk-in coolers	100103-100108	Per motor	Materials Labor Total	Distributors Estimate Built-up estimate	N/A N/A	\$42.81		Sample average Estimate Built-up estimate	\$226.20 \$42.81 \$269.01	\$73.65	\$41.89 N/A	N/A N/A see notes	
ECM fan motors for doored display case		Per motor	Materials Labor	Distributors Estimate	6 N/A	\$105.34 \$18.30	\$132.32	Sample average Estimate	\$122.41 \$18.30	\$230.94 \$73.65	\$13.58 N/A \$13.67 N/A	N/A N/A	Modeling
ECM fan motors for open display case		Per motor	Total Materials Labor	Built-up estimate Distributors Estimate	N/A 6 N/A		\$132.32	Built-up estimate Sample average Estimate	\$140.71 \$122.41 \$19.29	\$304.58 \$230.94 \$73.65	\$27.25 \$161.00 \$13.58 N/A \$13.67 N/A	see notes N/A N/A	Narrative_ECM_fan
ectivitali illotors for open display case			Total Materials	Built-up estimate Distributors	N/A 3	\$124.62	\$151.60	Built-up estimate Sample average	\$141.70 \$320.84	\$304.58 N/A	\$27.25 \$161.00 \$514.13 \$105.00	see notes	
Medium temp glass doors (retrofit)	9086	Per linear ft upright display case	Labor Total	Estimate Built-up estimate	N/A N/A		\$561.98	Estimate Built-up estimate	\$497.82	N/A N/A	\$99.81 N/A \$613.95 N/A	N/A see notes	Modeling
Medium temp glass doors (new)	9087	Per linear ft upright display case	Materials Labor Total	Distributors Estimate Built-up estimate	N/A N/A	\$324.48	В	Sample average Estimate Built-up estimate	\$686.29 \$324.48 \$1,010.77	\$574.87 \$331.41 \$906.27	\$515.58 N/A \$329.66 N/A \$845.24 N/A	N/A N/A see notes	Narrative_GlassDoo
Auto-closers on main cooler/freezer doors, <42" wide	100188, 100189	Per cooler door	Materials Labor	Distributors Estimate	1 N/A		\$155.67	Sample average Estimate	\$155.67 \$70.78	\$120.00 \$36.82		N/A N/A	To the second
Auto-closers on main cooler/freezer doors,	100188, 100189	Per cooler door	Total Materials Labor	Built-up estimate Distributors Estimate	N/A 1 N/A		\$917.19	Built-up estimate Sample average Estimate	\$226.45 \$917.19 \$140.36	\$156.82 \$120.00 \$36.82	\$433.22 N/A \$322.59 N/A \$110.63 N/A	see notes N/A N/A	Modeling Narrative_AutoClos
>42" wide	100188, 100189	Per cooler door	Total Materials	Built-up estimate Distributors		\$1,057.55 \$1	1,057.55 \$675.30	Built-up estimate Sample average	\$1,057.55 \$420.95	\$156.82 \$69.69	\$433.22 N/A \$62.50 N/A	see notes N/A	Retrofit only; standard offering from
Evaporator fan control on walk-in coolers/freezers (<1 hp)	100103-100108	Per motor	Labor Total	Estimate Built-up estimate	N/A N/A		\$874.85	Estimate Built-up estimate	\$199.55 \$620.50	\$92.06 \$161.74	\$83.25 N/A \$145.75 \$265.00	N/A see notes	multiple manufacturers
Evaporator fan control on walk-in coolers/freezers (>1 hp)		Per motor	Materials Labor Total	Distributors Estimate Built-up estimate	N/A N/A	\$762		Sample average Estimate Built-up estimate	\$1,212 \$762.14 \$1,974.26	\$69.69 \$92.06 \$161.74	\$62.50 N/A \$83.25 N/A \$145.75 \$265.00	N/A N/A see notes	Narrative_Evaporat orFanCtris
Floating suction pressure (retrofit)	9090	Per suction group	Materials Labor	Distributors Estimate	N/A N/A	\$0.00 \$5,460.00	\$0.00 00	Sample average Estimate	\$0.00 \$5,460.00	N/A N/A	\$13.18 N/A \$26.78 N/A	N/A N/A	Retrofit only; required by Title 24 for new construction
Floating head pressure (FHP), fixed setpoint			Total Materials	Distributors	N/A 1	\$4,008.68 \$4	4,008.68	Built-up estimate Sample average	\$5,460.00	N/A	\$39.96 N/A \$0.00 N/A	see notes N/A	Monative_FSP
(FSP) (air-cooled, retrofit)	9091	Per discharge group	Labor Total Materials	Estimate Built-up estimate Distributors	N/A N/A	\$4,673.43 \$8,682.11 \$8 \$4,008.68 \$4	8,682.11	Estimate Built-up estimate Sample average	\$4,673.43 \$8,682.11 \$4,008.68		\$27.90 N/A \$27.90 N/A \$0.00 N/A	N/A see notes N/A	Retrofit only; required by Title 24 for new construction
FHP, FSP (evap-cooled, retrofit)	9092	Per discharge group	Labor Total	Estimate Built-up estimate	N/A N/A	\$4,673.43 \$8,682.11 \$8	13 8,682.11	Estimate Built-up estimate	\$4,673.43 \$8,682.11	N/A	\$27.90 N/A \$27.90 N/A	N/A see notes	Modeling
FHP, variable setpoint (VSP) (air-cooled, retrofit)	9093	Per discharge group	Materials Labor Total	Distributors Estimate Puilt up octimate	N/A N/A	\$4,406.24 \$4 \$4,882.31 \$9,288.55 \$9	31	Estimate	\$4,406.24		\$10.04 N/A \$40.92 N/A \$50.95 N/A	N/A N/A	Narrative_FHP
FHP, VSP (evap-cooled, retrofit)	9094	Per discharge group	Materials Labor	Built-up estimate Distributors Estimate	1 N/A			Built-up estimate Sample average Estimate	\$9,288.55 \$4,709.27 \$4,897.46	N/A	\$8.93 N/A \$40.92 N/A	N/A N/A	
FHP, VSP & variable speed (VS) (air-cooled,			Total Materials	Built-up estimate Distributors	N/A 1	\$6,241.47 \$6	9,606.73 6,241.47		\$9,606.73 \$6,241.47	N/A N/A	\$49.85 N/A \$294.33 N/A	see notes N/A	
retrofit)	9095	Per discharge group	Labor Total Materials	Estimate Built-up estimate Distributors	N/A N/A		4,425.45	Estimate Built-up estimate Sample average	\$8,183.98 \$14,425.45 \$7,390.00	N/A	\$91.66 N/A \$385.99 N/A \$151.97 N/A	N/A see notes N/A	
FHP, VSP & VS (evap-cooled, retrofit)	9096	Per discharge group	Labor Total	Estimate Built-up estimate	N/A N/A	\$8,241.40 \$15,631.40 \$15	10 5,631.40	Estimate Built-up estimate	\$8,241.40 \$15,631.40	N/A N/A	\$68.92 N/A \$220.89 N/A	N/A see notes	
Strip curtains on walk-Ins (doors <36" wide)	100094	Per square foot	Materials Labor Total	Distributors Estimate Built-up estimate	N/A	\$5.06 \$3.45 \$8.51		Sample average Estimate Built-up estimate	\$8.97 \$3.45 \$12.42	\$7.50 \$2.72 \$10.22	N/A N/A	N/A N/A see notes	PE -
Strip curtains on walk-Ins (doors >36" wide)	100094	Per square foot	Total Materials Labor	Built-up estimate Distributors Estimate	2 N/A	\$5.06 \$2.04	\$12.02	Estimate	\$12.42 \$10.75 \$2.04	\$10.22 \$7.50 \$2.72	N/A N/A	N/A N/A	Narrative_StripCurt ains
			Total Materials	Built-up estimate Distributors	1	\$178.05	\$14.06 \$178.05	Built-up estimate Sample average	\$12.78 \$178.05	\$10.22 N/A	N/A N/A N/A N/A	see notes N/A	
LED lights in reach-in display cases		Per fixture	Labor Total Materials	Estimate Built-up estimate Distributors	N/A N/A			Estimate Built-up estimate Sample average	\$40.24 \$218.29 \$219.17	N/A	N/A N/A N/A N/A N/A N/A	N/A see notes N/A	Narrative_LEDCase
LED lights in open display cases		Per fixture	Labor Total	Estimate Built-up estimate	N/A N/A	\$30.70)	Estimate Built-up estimate	\$30.70 \$249.87	N/A	N/A N/A N/A N/A	N/A N/A see notes	Lights
Industrial Refrigeration (Refrigerate			Materials	Distributors	1	\$4,864.77 \$4	4,864.77	Sample average	\$4,864.77		\$13.18 N/A	N/A	Retrofit only; required by Title 24 for
Floating suction pressure (retrofit)	9097	Per suction group	Labor Total	Estimate Built-up estimate	N/A N/A	\$7,876.74 \$12,741.51 \$12	2,741.51	Estimate Built-up estimate	\$7,876.74	N/A	\$26.78 N/A \$39.96 N/A	N/A see notes	new construction See FSP doc embedded above Retrofit only: required by Title 24 for
FHP, FSP (evap-cooled, retrofit)	9098	Per discharge group	Materials Labor	Distributors Estimate	N/A	\$2,012.18 \$2		Sample average Estimate	\$2,012.18		\$0.00 N/A \$27.90 N/A	N/A N/A	new construction
			Total								\$27.90 N/A		See FHP doc embedded above
FHP, VSP (evap-cooled, retrofit)	9099	Per discharge group	Total Materials Labor	Built-up estimate Distributors Estimate	N/A 1 N/A	\$6,585.79 \$6 \$2,712.77 \$2 \$4,797.64	6,585.79 2,712.77 54	Built-up estimate Sample average Estimate	\$6,585.79 \$2,712.77 \$4,797.64	N/A N/A N/A	\$27.90 N/A \$8.93 N/A \$40.92 N/A	see notes N/A N/A	See FHP doc embedded above
FHP, VSP (evap-cooled, retrofit)		Per discharge group	Total Materials Labor Total Materials	Built-up estimate Distributors Estimate Built-up estimate Distributors	N/A 1 N/A N/A	\$6,585.79 \$6 \$2,712.77 \$2 \$4,797.64 \$7,510.41 \$7 \$5,893.50 \$5	6,585.79 2,712.77 54 7,510.41 5,893.50	Built-up estimate Sample average Estimate Built-up estimate Sample average	\$6,585.79 \$2,712.77 \$4,797.64 \$7,510.41 \$5,893.50	N/A N/A N/A N/A	\$8.93 N/A \$40.92 N/A \$49.85 N/A \$151.97 N/A	see notes N/A N/A see notes N/A	See FHP doc embedded above
FHP, VSP (evap-cooled, retrofit) FHP, VSP & VS (evap-cooled, retrofit)	9099 9100		Total Materials Labor Total	Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate	N/A 1 N/A N/A 1 N/A	\$6,585.79 \$6 \$2,712.77 \$2 \$4,797.64 \$7,510.41 \$7 \$5,893.50 \$5 \$8,241.16	6,585.79 2,712.77 54 7,510.41 5,893.50	Built-up estimate Sample average Estimate Built-up estimate	\$6,585.79 \$2,712.77 \$4,797.64 \$7,510.41	N/A N/A N/A N/A N/A N/A	\$8.93 N/A \$40.92 N/A \$49.85 N/A	see notes N/A N/A see notes	See FHP doc embedded above
FHP, VSP (evap-cooled, retrofit) FHP, VSP & VS (evap-cooled, retrofit) Food Service		Per discharge group	Total Materials Labor Total Materials Labor	Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate Built-up estimate	N/A 1 N/A N/A 1 N/A 1 N/A	\$6,585.79 \$6 \$2,712.77 \$2 \$4,797.64 \$7,510.41 \$7 \$5,893.50 \$5 \$8,241.16 \$14,134.66 \$14 \$53.85 \$	6,585.79 2,712.77 64 67,510.41 65,893.50 16 4,134.66	Built-up estimate Sample average Estimate Built-up estimate Sample average Estimate	\$6,585.79 \$2,712.77 \$4,797.64 \$7,510.41 \$5,893.50 \$8,241.16 \$14,134.66	N/A N/A N/A N/A N/A N/A	\$8.93 N/A \$40.92 N/A \$49.85 N/A \$151.97 N/A \$68.92 N/A	see notes N/A N/A see notes N/A N/A	SCE's workpaper IMC for electric 6/yers is \$2,225/unit. SDGRE's workpaper IMC
FHP, VSP (evap-cooled, retrofit) FHP, VSP & VS (evap-cooled, retrofit)		Per discharge group Per discharge group	Total Materials Labor Total Materials Labor Total Materials Materials Materials Materials Materials Materials Materials	Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate	2 N/A 1 N/A 2 N/A 1 N/A 1 N/A 2 N/A 8 S 5 13	\$6,585.79 \$6 \$2,712.77 \$2 \$4,797.64 \$7,510.41 \$7 \$5,893.50 \$5 \$8,241.16 \$14,134.66 \$14 \$53.85 \$ \$0.48 \$ N/A N/A N/A	2,712.77 2,712.77 34 77,510.41 5,893.50 16 4,134.66 231.74 154.38 1/A	Built-up estimate Sample average Estimate Built-up estimate Sample average Estimate Built-up estimate Built-up estimate Baseline average Measure average Matched pair IMC Sample average IMC	\$6,585.79 \$2,712.77 \$4,797.64 \$7,510.41 \$5,893.50 \$8,241.16 \$14,134.66 \$105.76 \$132.01 \$27.25 \$26.25	N/A N/A N/A N/A N/A N/A N/A N/A N/A	\$8.93 N/A \$40.92 N/A \$49.95 N/A \$151.97 N/A \$68.92 N/A \$220.89 N/A \$12,089 N/A \$8,762 N/A	see notes N/A N/A see notes N/A N/A see notes \$4,108 \$4,876	SCEs workpaper IMC for electric byers
FHP, VSP (evap-cooled, retrofit) FHP, VSP & VS (evap-cooled, retrofit) Food Service		Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit production	Total Materials Labor Total Materials Labor Total Materials	Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate Built-up estimate	8 5 13 13 12 14	\$6,585.79 \$6 \$2,712.77 \$2 \$4,797.64 \$7,510.41 \$7 \$5,893.50 \$5 \$8,241.16 \$14,134.66 \$14 \$\$53.85 \$\$ \$0.48 \$\$ N/A \$N/A \$N/A \$N/A \$11.43 \$\$	6,585.79 2,712.77 54 67,510.41 5,893.50 16 4,134.66 231.74 154.38 1/A 1/A 84.89 83.40	Built-up estimate Sample average Estimate Built-up estimate Sample average Estimate Built-up estimate Built-up estimate Built-up estimate Built-up estimate Measure average Matched pair IMC	\$6,585.79 \$2,712.77 \$4,797.64 \$7,510.41 \$5,893.50 \$8,241.16 \$14,134.66 \$105.76 \$132.01 \$27.25 \$26.25 \$32.90 \$57.51	N/A	\$8.93 N/A \$40.92 N/A \$49.85 N/A \$151.97 N/A \$68.92 N/A \$20.89 N/A \$12.089 N/A N/A \$12.089 N/A N/A \$12.080 N/A \$12.080 N/A \$151.91 N/A \$4,103 N/A	see notes N/A N/A see notes N/A N/A see notes S4,108 \$4,876	ICCTs workpaper IMC for electric types IS-2, 223-pc. M. Sodiets workpaper IMC to electric types IS-2, 223-pc. M. Sodiets workpaper IMC to gain types IS-2, 233-pc. M. Sodiets Report IMC for gain types IS-2, 233-pc.
FIAP, VSP (evap-cooled, retrofit) FIAP, VSP & VS (evap-cooled, retrofit) FOOD Service Electric fryer		Per discharge group Per discharge group Per unit production capacity (lbs/hr)	Total Materials Labor Total Materials Labor Total Materials	Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate Built-up estimate Built-up estimate Distributors Distributors (4)	8 N/A 1 N/A	\$6,585.79 \$6 \$2,712.77 \$2 \$4,797.64 \$7 \$5,893.50 \$5 \$8,24.116 \$11,134.66 \$14 \$1,134.66 \$14 \$1,134.66 \$14 \$1,134.66 \$14 \$1,134.61	6,585.79 2,712.77 54 47,7510.41 5,893.50 16 4,134.66 231.74 154.38 1/A 1/A 84.89 83.40 1/A 1/A	Built-up estimate Sample average Stimate Built-up estimate Baseline average Measure average Matched pair IMC Sample average IMC Baseline average Natched pair IMC Sample average Matched pair IMC Sample average Matched pair IMC Sample average	\$6,585.79 \$2,712.77 \$4,797.64 \$7,7510.41 \$5,893.50 \$8,241.16 \$105.76 \$132.01 \$27.25 \$26,25 \$32.90 \$57.51 \$30.28 \$4,709	N/A	\$8.93 N/A \$40.92 N/A \$49.85 N/A \$151.97 N/A \$68.92 N/A \$220.89 N/A \$12,089 N/A N/A \$1,521 N/A	see notes N/A N/A see notes N/A N/A see notes \$4,108 \$4,876 \$769 \$3,367	SCT's workpaper IMC for electric hypers 152.23.54m. 500.6EV workpaper IMC for electric hypers 152.23.54m. 500.6EV workpaper IMC for get electric hypers 152.20.6EE and SCCV workpaper IMC for get figures 153.20.6. Ministry SCT workpaper IMC for size convention of the size of the siz
FIAP, VSP (evap-cooled, retrofit) FIAP, VSP & VS (evap-cooled, retrofit) FOOD Service Electric fryer		Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit production	Total Materials Labor Total Materials Labor Total Materials	Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate Built-up estimate Built-up estimate Distributors Distributors (4)	8 N/A 1 N/A 1 N/A 1 N/A 1 N/A 2 N/A 1 N/A 1 N/A 1 N/A 2 N/A 5 13 13 12 14 28 28 5 5 10	\$6,585.79 \$6 \$2,712.77 \$2 \$2,772.77 \$2 \$4,797.64 \$7 \$5,893.00 \$5 \$8,241.16 \$14,134.66 \$144 \$1,34.66 \$144 \$1,	6,585.79 2,712.77 54 77,510.41 55,893.50 16 4,134.66 231.74 154.38 //A //A 84.89 83.40 //A //A 6,763 6,325	Built-up estimate Sample average Sample average Built-up estimate Built-up estimate Built-up estimate Built-up estimate Built-up estimate Baseline average Matched pair IMC Sample average IMC Baseline average Matched pair IMC Sample average Matched pair IMC Sample average Matched pair IMC Masura average Measura average	\$6,585.79 \$2,712.77 \$2,712.77 \$4,797.64 \$7,510.41 \$5,893.50 \$8,241.16 \$105.76 \$132.01 \$2,725 \$32.90 \$5,751.64 \$105.76 \$105.76 \$132.01 \$2,725 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$32.90 \$5,751 \$5,775 \$	N/A	\$8.31 N/A \$40.92 N/A \$40.92 N/A \$40.93 N/A \$40.93 N/A \$151.57 N/A \$508.52 N/A \$22.03 N/A \$22.03 N/A \$12.03 N/A \$12.03 N/A \$13.03 N/A \$1.03 N/A \$1.	see notes N/A N/A see notes N/A N/A see notes N/A N/A see notes S4,108 S4,876 S769 S3,367 S4,384 S1,017 S4,108 S5,115	SCT's workpaper IMC for electric byers 152.23-25/mil. 5006E/s workpaper IMC for electric byers 152.23-25/mil. 5006E/s and SCC's workpaper IMC for gardenis 51.30.6 Elean SCC's workpaper IMC for gardenis 51.30.6 Ele
FIP, VSP (evap-cooled, retrofit) FIP, VSP & VS (evap-cooled, retrofit) Food Service Electric fryer Gas fryer Electric convection oven (full size)		Per discharge group Per discharge group Per discharge group Per unit groduction capacity (lbs/hr) Per unit groduction capacity (lbs/hr) Per unit	Total Materials Labor Total Materials Labor Total Materials	Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate Built-up estimate Built-up estimate Constributors Distributors (4) Distributors (2) Distributors (2)	8 N/A 1 N/A 1 N/A 1 N/A 2 N/A 1 1 1 N/A 2 N/A 2 N/A 2 N/A 2 N/A 5 13 13 13 14 28 28 5 5 10 10 2	\$6,585.79 \$6 \$2,712.77 \$2 \$4,797.64 \$7,510.41 \$7 \$5,893.50 \$5 \$8,241.16 \$14,134.66 \$14 \$\$ 53.85 \$ \$ 30.48 \$ \$N/A	6,585.79 2,712.77 54 67,510.41 5,5893.50 16 4,134.66 231.74 154.38 1/A 1/A 84.89 83.40 1/A 1/A 6,763 6,325 1/A	Bult-up estimate Sample average Estimate Bult-up estimate Sample average Estimate Sample average Estimate Bult-up estimate Bult-up estimate Buseline average Measure average M	\$6,585.79 \$2,712.77 \$4,797.64 \$7,510.41 \$5,893.50 \$8,241.16 \$14,134.66 \$106.76 \$132.01 \$27.25 \$26.25 \$32.90 \$5.751 \$30.28 \$24.61 \$4,709 \$4,119 \$(\$500) \$3,261	N/A	\$8.93 N/A \$40.92 N/A \$40.95 N/A \$40.95 N/A \$40.95 N/A \$515.197 N/A \$568.92 N/A \$22.039 N/A \$22.039 N/A \$12.039 N/A \$12.039 N/A \$12.039 N/A \$12.039 N/A \$12.039 N/A \$13.00 N/A \$1.00 N/A \$1	see notes N/A N/A see notes N/A N/A see notes \$4,108 \$4,876 \$769 \$3,367 \$4,384 \$5,115 \$5,115 \$1,007 \$4,349	SSTs workspaper IAIC for electric frames is 22.295 (mil. 500 fc) workspaper IAIC for electric fryers is 23.205 (mil. 500 fc) workspaper IAIC for gas represented to the state of the state
FIP, VSP (evap-cooled, retrofit) FIP, VSP & VS (evap-cooled, retrofit) FOOD Service Electric fryer Gas fryer Electric convection oven (full size) Gas convection oven (full size)		Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit production capacity (lbs/hr)	Total Materials Labor Total Materials Labor Total Materials Labor Total Materials	Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate Built-up estimate Built-up estimate Constributors Distributors Distributors (4)	8 5 13 13 12 14 28 5 5 10 10 10 2 2 2 4	\$6,585.79\$ \$5,271.277\$ \$2,327.641\$ \$7,571.641\$ \$7,571.641\$ \$7,571.641\$ \$7,571.641\$ \$7,571.641\$ \$7,571.641\$ \$7,571.641\$ \$7,571.641\$ \$7,671.	6,585.79 2,712.77 34 7,7510.41 5,893.50 16 4,134.66 231.74 154.38 1/A 84.89 83.40 1/A 6,763 6,325 1/A 3,112 3,278	Bult-up estimate Sample average Estimate Bult-up estimate Sample average Estimate Sample average Estimate Bult-up estimate Bult-up estimate Buseline average Measure average	\$6,585.79 \$2,712.77 \$4,797.64 \$7,510.41 \$5,893.50 \$8,241.16 \$14,134.66 \$106.76 \$132.01 \$27.25 \$26.25 \$32.90 \$5.751 \$30.28 \$24.61 \$4,709 \$4,119 \$(\$500) \$3,261	N/A	\$8.93 N/A \$40.92 N/A \$40.95 N/A \$40.95 N/A \$40.95 N/A \$515.197 N/A \$568.92 N/A \$22.039 N/A \$22.039 N/A \$12.039 N/A \$12.039 N/A \$12.039 N/A \$12.039 N/A \$12.039 N/A \$13.00 N/A \$1.00 N/A \$1	see notes N/A N/A see notes N/A N/A see notes N/A N/A see notes \$4,108 \$4,876 \$769 \$3,367 \$4,384 \$1,017 \$4,108 \$5,115 \$1,007	SCT's workpaper IMC for electric byers 18.2.236/mil. 5006E's workpaper IMC to electric byers 18.2.206 electric byers 18.2.236 mil. 5006E's workpaper IMC for ga fyers in \$5.100. Millstanday Millstanday SCT's workpaper IMC for ga COT's workpaper IMC gas Millstanday Mills
FIRP, VSP (evap-cooled, retrofit) FIRP, VSP & VS (evap-cooled, retrofit) FOOD Service Bectric fryer Gas fryer Bectric convection oven (full size) HVAC Maintenance	9100 169, 170-172, 10049, 10050,	Per discharge group Per discharge group Per discharge group Per unit groduction capacity (lbs/hr) Per unit groduction capacity (lbs/hr) Per unit	Total Materials Labor Total Materials Labor Total Materials Labor Total Materials	Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate Built-up estimate Distributors Catimate Dustributors Catimate Dustributors Catimate Dustributors Catimate Distributors Catimate Distributors Catimate Distributors Catimate Distributors Catimate Distributors Catimate Cati	8 5 13 13 12 14 28 5 5 10 10 10 2 2 2 4	\$5,585.70 \$5 \$2,712.77 \$2 \$4,797.64 \$7 \$5,7510.41 \$7 \$5,589.3-0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$5,893.0 \$5 \$7,755 \$5 \$7,75	231.74 7,510.41 7,510.41 7,510.41 7,510.41 7,510.41 7,510.41 1,5,893.50 16 4,134.66 84.89 84.80 84.80 84.80 84.80 84.80 84.80 84.80 84.80 84.80 84.80 84.80 84.80 84.80 84.80	Built-up estimate Sample average Estimate Built-up estimate Sample average Estimate Sample average Estimate Built-up estimate Baseline average Matched pair IMC Baseline average	\$6.585.79 \$2,712.77 \$4,797.64 \$7,510.41 \$5,893.50 \$8,241.16 \$14,134.66 \$106.76 \$ 106.76 \$ 27.25 \$ 26.25 \$ 22.26 \$ 24.61 \$ 4,179 \$ (590) \$ 3,261 \$ 3,3051 \$ (590) \$ 3,261 \$ (210) \$ (210)	N/A	\$8.93 N/A \$40.92 N/A \$40.92 N/A \$40.92 N/A \$40.93 N/A \$50.93 N/A \$50.93 N/A \$50.93 N/A \$151.97 N/A \$50.90 N/A \$11.009 N/A \$11.009 N/A \$1.100 N/A	see notes N/A N/A see notes N/A See notes N/A See notes S4, 108 S4, 876 S3, 367 S4, 384 S1, 017 S4, 108 S5, 115 S1, 007 S4, 349 S5, 526 S1, 177 N/A	ICCS workpaper IMC for electric byen. 15.2.23-25.mt. 500EN workpaper IMC to electric byen is 15.2.25.mt. 15.0.25.mt. 500EN workpaper IMC for gar byen is 15.2.05.mt. 15.0.25.mt. 50.2.05.mt. 15.0.25.m
FIP, VSP (evap-cooled, retrofit) FIP, VSP & VS (evap-cooled, retrofit) FOOD Service Electric fryer Gas fryer Electric convection oven (full size) Gas convection oven (full size)	9100 169, 170-172, 10049, 10050, 10051, 10051, 10052, 100541, 10072	Per discharge group Per discharge group Per discharge group Per unit groduction capacity (lbs/hr) Per unit production capacity (lbs/hr) Per unit	Total Materials Labor Total Materials Labor Total Materials Labor Total Materials	Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate Built-up estimate Built-up estimate Constributors Distributors (4) Distributors (2) Distributors (2)	8 5 13 13 12 14 28 5 5 10 10 10 2 2 2 4	\$\frac{\$\5,585.79\$}{\$5,271.77\$}\$\frac{\$5}{\$2,712.77\$}\$\frac{\$2,771.77\$}{\$2,771.75\$}\$\frac{\$5,893.50}{\$5,893.50}\$\frac{\$5,893.50}{\$5,994.80}\$\frac{\$5,893.50}{\$5,943.80}\$\frac{\$5,893.50}{\$5,943.80}\$\frac{\$5,893.50}{\$5,943.80}\$\frac{\$5,893.50}{\$5,943.80}\$\frac{\$5,943.50}{\$5,943.80}\$\frac{\$5,943.50}{\$5,943.80}\$\frac{\$5,943.50}{\$5,943.80}\$\frac{\$5,943.80}{\$5,943.80}\$\f	72,712,77,7510.41 72,772,77,7510.41 73,5893.50 74,713,77,7510.41 75,5893.50 74,134.66	Bull-up extimate Sample average Estimate Bull-up extimate Sample average Estimate Sample average Estimate Bull-up extimate Bull-up extimate Baseline average Measure average M	\$6.585.79 \$2,712.77 \$4,797.64 \$75,510.41 \$57,510.41 \$51,4,134.66 \$106.76 \$132.01 \$132.01 \$132.01 \$132.01 \$132.01 \$14,134.66 \$106.76 \$132.01 \$12,25 \$1	N/A	\$8.93 N/A \$40.92 N/A \$40.92 N/A \$40.92 N/A \$40.92 N/A \$40.92 N/A \$50.92 N/A \$	see notes N/A N/A see notes N/A see notes N/A see notes S4, 108 S4, 876 S3, 367 S4, 384 S1, 017 S4, 108 S5, 115 S1, 007 S4, 138 S5, 115 S1, 107 S4, 108 S5, 115	ICCS workpaper IMC for electric byen. 15.2.2.3.5m.ti. 500EX workpaper IMC for electric flyers in 50m.ti. 500EX workpaper IMC for parties in 51.20.5m.ti. 50m.ti. 50m.t
FIRP, VSP (evap-cooled, retrofit) FIRP, VSP & VS (evap-cooled, retrofit) FOOD Service Bectric fryer Gas fryer Bectric convection oven (full size) HVAC Maintenance	169, 170-172, 10049, 10050, 10051, 10051, 10054, 10079, 10054, 10079, 10054, 10079, 10054, 10079, 10054, 10079, 10055-10054, 10079, 10055-10054, 10079-10056, 10055-10054, 10079-10056, 10055-10056, 100	Per discharge group Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit production capacity (lbs/hr) Per unit Per unit Per unit	Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Aborerals Aborerals Aborerals Materials Labor Total Materials Labor Total Materials Labor Total Materials Labor Labor Labor Materials Labor Labor Labor Materials Materials Labor	Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate Built-up estimate Distributors Catimate Dustributors Catimate Dustributors Catimate Dustributors Catimate Distributors Catimate Distributors Catimate Distributors Catimate Distributors Catimate Distributors Catimate Cati	N/A 1 N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	\$\frac{\$5,887,70}{\$5,2712,77}\$\$ \frac{\$5}{\$2,712,77}\$\$ \frac{\$5}{\$2,712,77}\$\$ \frac{\$5}{\$2,712,77}\$\$ \frac{\$5}{\$2,712,77}\$\$ \frac{\$5}{\$2,712,71}\$\$ \frac{\$5}{\$2,872,11}\$\$ \frac{\$5}{\$2,	7,5,50.41 10,5,5,5,0.41 10,6,7,5,5,0.41 10,6,7,5,5,0.41 10,6,7,5,5,0.41 10,7,5,5,0.41 10,7,5,5,0.41 10,7,5,5,0.41 10,7,5,0.41	Bull-up extinate Sample average Estinate Bull-up extinate Sample average Estinate Sample average Estinate Bull-up extinate Bull-up extinate Bull-up extinate Bull-up extinate Bull-up extinate Buseline average Meature average Sample average Sample average Sample average Sample average	\$6.585.79 \$2.712.77 \$4.797.64 \$7.510.41 \$7.510.41 \$7.510.41 \$7.510.41 \$7.510.41 \$7.510.41 \$7.510.41 \$7.510.41 \$7.510.41 \$7.510.41 \$7.610	N/A	\$8.93 NJA \$40.92 NJA \$40.92 NJA \$40.92 NJA \$40.92 NJA \$40.92 NJA \$5151.97 NJA \$58.82 NJA \$5151.97 NJA \$58.82 NJA \$51.20.98 NJA \$51.20.98 NJA \$51.20.98 NJA \$51.20.98 NJA \$51.20.98 NJA \$51.20.98 NJA \$51.20 NJA \$	see notes N/A N/A N/A N/A N/A See notes S4,108 S4,876 S3,367 S4,384 S1,107 S4,108 S5,115 S1,007 S4,308 S5,115 S1,007 S4,308 S5,115 S1,007 S4,308 S5,115 S1,007 N/A	ICCS workpaper IMC for electric byen. 15.2.2.3.5m.ti. 500EX workpaper IMC for electric flyers in 50m.ti. 500EX workpaper IMC for parties in 51.20.5m.ti. 50m.ti. 50m.t
FIRP, VSP (evap-cooled, retrofit) FIRP, VSP & VS (evap-cooled, retrofit) FOOD Service Electric fryer Gas fryer Electric convection oven (full size) Gas convection oven (full size) HVAC Maintenance Duct Testing and Sealing Refrigerant Charging and Adjustment	169, 170-172, 10049, 10050, 10055, 10056, 10061, 10062, 10016, 10	Per discharge group Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit production capacity (lbs/hr) Per unit Per unit Per unit	Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Total Total Total Total Total Total Total	Built-up estimate Suilt-up estimate Built-up estimate Built-up estimate Built-up estimate Built-up estimate Built-up estimate Built-up estimate Constributors (4) Distributors (2) Distributors (2) Distributors (5)	N/A 1 N/A	\$\frac{\$5,887,70}{\$5,2712,77}\$\$ \frac{\$5}{\$2,712,77}\$\$ \frac{\$5}{\$2,712,77}\$\$ \frac{\$5}{\$2,712,77}\$\$ \frac{\$5}{\$2,712,77}\$\$ \frac{\$5}{\$2,712,71}\$\$ \frac{\$5}{\$2,872,11}\$\$ \frac{\$5}{\$2,	72,712,712,712,712,712,712,712,712,712,7	Bult-up extinate Sample average Estinate Bult-up extinate Sample average Estinate Sample average Estinate Bult-up extinate Bult-up extinate Buster Bu	\$6,585.79 \$4,797.64 \$7,510.41 \$7,510.41 \$7,510.41 \$7,510.41 \$1,607.65 \$132.01 \$14,134.66 \$132.01 \$12,77.55 \$132.01 \$12,77.55 \$132.01 \$12,77.55 \$132.01 \$12,77.55 \$132.01 \$12,77.55 \$132.01 \$13	NIA NIA NIA NIA NIA NIA NIA NIA NIA NIA	\$8.93 N/A \$40.92 N/A \$40.92 N/A \$40.98 N/A \$40.98 N/A \$5151.97 N/A \$58.92 N/A \$5151.97 N/A \$5151.97 N/A \$51.2069 N/A \$51.2069 N/A \$51.207 N/A \$51.208 N/A \$51.208 N/A \$51.208 N/A	see notes N/A N/A N/A see notes N/A See notes S4, 108 S5, 115 S1, 007 S4, 304 S5, 115 S1, 007 S4, 349 S5, 115 S1, 007 S4, 349 S5, 1177 N/A N/A N/A N/A N/A N/A N/A N/A	ICCS workpaper IMC for electric byen. 15.2.23-25.mt. 500EN workpaper IMC to electric byen is 15.2.25.mt. 15.0.25.mt. 500EN workpaper IMC for gar byen is 15.2.05.mt. 15.0.25.mt. 50.2.05.mt. 15.0.25.m
FIP, VSP (evap-cooled, retrofit) FIP, VSP & VS (evap-cooled, retrofit) FOOD Service Electric fryer Gas fryer Electric convection oven (full size) Gas convection oven (full size) HVAC Maintenance Duct Testing and Sealing Refrigerant Charging and Adjustment Evaporator Coil Cleaning (nonres)	169, 170-172, 10049, 10050, 10054, 100141, 100176, 10054, 100176, 10054, 100176, 10054, 100176, 10055-10060, 100175, 100175, 100175, 100175	Per discharge group Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit production capacity (lbs/hr) Per unit Per unit Per unit Per dwelling Per ton cooling served	Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Labor Total Labor Total Materials Material	Built-up estimate Sistinate Built-up estimate Built-up estimate Built-up estimate Built-up estimate Built-up estimate Obstributors (4) Obstributors (2) Obstributors (2) Obstributors (2) Obstributors (3) Of contractors Of contractors Di contractors	N/A 1 N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	September Sept	72,712,712,712,712,712,712,712,712,712,7	Built-up estimate Sample average Estimate Built-up estimate Sample average Estimate Built-up estimate Built-up estimate Built-up estimate Busseline average Matched pair IMC Baseline average Matched pair IMC Sample average	\$ 155.87.95 \$ 77.16 \$ 105.70 \$ 10	NIA	\$8.93 N/A \$40.92 N/A \$40.92 N/A \$40.92 N/A \$40.93 N/A \$40.93 N/A \$58.92 N/A \$58.92 N/A \$58.92 N/A \$515.197 N/A \$51.209 N/A \$51.217 N/A \$51.217 N/A \$51.217 N/A \$51.217 N/A \$51.21 N/A \$51.921 N/A \$51.93 N/A	See notes: N/A N/A N/A See notes: See notes: See notes: See notes: SA 108 89 SA 206 SA 2	ICCS workpaper IMC for electric byen. 15.2.2.3.5m.ti. 500EX workpaper IMC for electric flyers in 50m.ti. 500EX workpaper IMC for parties in 51.20.5m.ti. 50m.ti. 50m.t
FIRP, VSP (evap-cooled, retrofit) FIRP, VSP & VS (evap-cooled, retrofit) FOOD Service Electric fryer Gas fryer Electric convection oven (full size) Gas convection oven (full size) HVAC Maintenance Duct Testing and Sealing Refrigerant Charging and Adjustment	169, 170-172, 10049, 10050, 10051, 10	Per discharge group Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit production capacity (lbs/hr) Per unit Per unit Per unit Per unit	Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Labor Total Labor Total Materials Labor Total Total Materials Labor Total Total Materials Labor Total Naterials Na	Built-up estimate Distributors Estimate Built-up estimato Distributors Estimate Built-up estimate Built-up estimate Built-up estimate Distributors (2) Distributors (2) Distributors (2) Distributors (3) Distributors (5)	N/A 1 N/A 1 N/A 1 N/A	September Sept	72,51,61,62,885,79,72,712,712,712,712,712,712,712,712,713,713,713,713,713,713,713,713,713,713	Built-up estimate Sample average Estimate Built-up estimate Sample average Estimate Built-up estimate Built-up estimate Built-up estimate Built-up estimate Busilt-up estimate Baseline average Matched pair IMC Sample average	\$ 155,879,879,879,879,879,879,879,879,879,879	NIAN NIAN NIAN NIAN NIAN NIAN NIAN NIAN	\$8.93 N/A \$40.92 N/A \$40.92 N/A \$40.92 N/A \$40.93 N/A \$40.93 N/A \$58.92 N/A \$58.92 N/A \$58.92 N/A \$515.197 N/A \$51.209 N/A \$51.217 N/A \$51.217 N/A \$51.217 N/A \$51.21 N/A \$51.21 N/A \$51.921 N/A \$51.93 N/A	See notes: N/A N/A N/A N/A N/A See notes: See notes: S4, 108 S54, 876 S709 S3, 867 S4, 388 S51, 107 N/A	ICCS workpaper IMC for electric byen. 15.2.2.3.5m.ti. 500EX workpaper IMC for electric flyers in 50m.ti. 500EX workpaper IMC for parties in 51.20.5m.ti. 50m.ti. 50m.t
FIP, VSP (evap-cooled, retrofit) FIP, VSP & VS (evap-cooled, retrofit) FOOD Service Electric fryer Gas fryer Electric convection oven (full size) Gas convection oven (full size) HVAC Maintenance Duct Testing and Sealing Refrigerant Charging and Adjustment Evaporator Coil Cleaning (nonres)	169, 170-172, 10049, 10050, 10054, 100141, 100176, 10054, 100176, 10054, 100176, 10054, 100176, 10055-10060, 100175, 100175, 100175, 100175	Per discharge group Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit production capacity (lbs/hr) Per unit Per unit Per unit Per dwelling Per ton cooling served	Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Aborerials Aborer	Built-up estimate Sistinate Built-up estimate Built-up estimate Built-up estimate Built-up estimate Built-up estimate Obstributors (4) Obstributors (2) Obstributors (2) Obstributors (2) Obstributors (3) Of contractors Of contractors Di contractors	N/A 1 N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	\$\$\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	(2,712,77) (3,72,710,71) (4,72,710,71) (5,72,710,71) (6,72,710,71) (7,72,71)	Bull-up extinate Sample average Estinate Bull-up extinate Sample average Estinate Sample average Estinate Sample average Estinate Bull-up extinate Buseline average Meature average Sample average	\$ 588.9 A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	NIAN NIAN NIAN NIAN NIAN NIAN NIAN NIAN	\$8.93 N/A \$40.92 N/A \$40.92 N/A \$40.92 N/A \$40.92 N/A \$40.92 N/A \$5151.97 N/A \$58.82 N/A \$5151.97 N/A \$58.82 N/A \$51.089 N/A \$51.20.98 N/A \$51.20.99 N/A	See notes: M/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N	ICCS workpaper IMC for electric byen. 15.2.2.3.5m.ti. 500EX workpaper IMC for electric flyers in 50m.ti. 500EX workpaper IMC for parties in 51.20.5m.ti. 50m.ti. 50m.t
FIP, VSP (evap-cooled, retrofit) FIP, VSP & VS (evap-cooled, retrofit) FROM SERVICE Electric fryer Gas fryer Electric convection oven (full size) Gas convection oven (full size) HVAC Maintenance Duct Testing and Sealing Refrigerant Charging and Adjustment Evaporator Coil Cleaning (nonres) Condenser Coil Cleaning (nonres)	169, 170-172, 10049, 10050, 10055, 10055, 10055, 10056, 10061, 10062, 10063-10070, 100134, 140, 1179, 10045-10048, 10051-10054, 10051-10048, 100155, 100155	Per discharge group Per discharge group Per discharge group Per unit groduction capacity (lbs/hr) Per unit groduction capacity (lbs/hr) Per unit Per unit Per unit Per dwelling Per ton cooling served Per ton cooling served	Total Materials Labor Total Materials Labor Total Tota	Built-up estimate Distributors Estimate Built-up estimators Estimate Built-up estimators Estimate Built-up estimators Constributors (2) Distributors (3) Distributors (2) Distributors (2) Distributors (3) Distri	N/A 1 N/A 1 N/A 1 N/A N/A 1 N/A N/A 1 1 N/A 1	\$\frac{\$\sigma_{5}\sigma_{7}\pi_{9}\$ \$\sigma_{5}\sigma_{7}\pi_{9}\$ \$\sigma_{5}\sigma_{7}\pi_{1}\	(A, 134, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50	Bullt-up extinate Sample average Estimate Bullt-up extinate Sample average Estimate Sample average Estimate Bullt-up extinate Sample average Measure average Sample average	65887.9 67.00 67	NIAN NIAN NIAN NIAN NIAN NIAN NIAN NIAN	\$8.93 N/A \$40.92 N/A \$40.92 N/A \$40.92 N/A \$40.93 N/A \$5151.97 N/A \$58.82 N/A \$5151.97 N/A \$58.82 N/A \$51.089 N/A \$51.089 N/A \$51.089 N/A \$51.92 N/A \$51.92 N/A \$51.92 N/A \$51.92 N/A \$51.92 N/A \$51.92 N/A \$51.93 N/A	see notes see no	1927's workpaper IAM. for electric hyers 19.32 235'ALT. 5006E's workpaper IAM. 19.32 235'ALT. 5006E's workpaper IAM. 19.30 68 And 500's workpa
FIP, VSP (evap-cooled, retrofit) FIP, VSP & VS (evap-cooled, retrofit) FOOD Service Electric fryer Gas fryer Electric convection oven (full size) Gas convection oven (full size) HVAC Maintenance Duct Testing and Sealing Refrigerant Charging and Adjustment Evaporator Coil Cleaning (nonres) Condenser Coil Cleaning (nonres) Economizer repair	169, 170-172, 10049, 10050, 10055, 10055, 10055, 10056, 10061, 10062, 10063-10070, 100134, 140, 1179, 10045-10048, 10051-10054, 10051-10048, 100155, 100155	Per discharge group Per discharge group Per discharge group Per unit groduction capacity (lbs/hr) Per unit groduction capacity (lbs/hr) Per unit Per unit Per unit Per dwelling Per ton cooling served Per ton cooling served	Total Materials Labor Materials Labor Total Materials Labor	Built-up estimate Distributors Estimate Built-up estimators Estimate Built-up estimators Estimate Built-up estimators Constributors (2) Distributors (3) Distributors (2) Distributors (2) Distributors (3) Distri	N/A 1 N/A 1 N/A N/A N/A 1 N/A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	\$\frac{\$\sigma_{\cong}\sigma_{	(A)	Bullt-up extinate Sample average Satimate Bullt-up extinate Sample average Satimate Sample average Satimate Sample average Satimate Bullt-up extinate Sample average Measure average Sample average	56387.9 57.00 57	NIAN NIAN NIAN NIAN NIAN NIAN NIAN NIAN	\$8.93 N/A \$40.92 N/A \$40.92 N/A \$40.98 N/A \$40.98 N/A \$5151.97 N/A \$58.82 N/A \$5151.97 N/A \$58.82 N/A \$51.089 N/A \$51.089 N/A \$51.089 N/A \$51.089 N/A \$51.70 N/A \$51.71 N/A \$51.70 N/A \$51.70 N/A \$51.71 N/A \$51.70 N/A \$51.71 N/A \$51.70 N/A	See notes	ISCE's workpaper IMC for electric hyers 18.2.2356.mt. SOGEN workpaper IMC 18.2.2356.mt. SOGEN workpaper IMC for pa 18.2.2356.mt. SOGEN workpaper 18.2.2356.
FIP, VSP (evap-cooled, retrofit) FIP, VSP & VS (evap-cooled, retrofit) FROM Service Electric fryer Gas fryer Electric convection oven (full size) HVAC Maintenance Duct Testing and Sealing Refrigerant Charging and Adjustment Evaporator Coil Cleaning (nonres) Condenser Coil Cleaning (nonres) Economizer repair Water Heating Fipe insulation (SHW)	169, 170-172, 10049, 10050, 10051, 10051, 10051, 10051, 10051, 10061, 10061, 10061, 10061, 10061, 10061, 10061, 10061, 10075, 10061, 10075, 10061, 10075, 10061, 10075, 10	Per discharge group Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit production capacity (lbs/hr) Per unit Per unit Per unit Per dwelling Per ton cooling served Per ton cooling served Per ton cooling served	Total Materials (Labor Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Cabor Materials Labor Total Total Materials Labor Total Labor Total Materials Labor Total	Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate Built-up estimate Built-up estimate Built-up estimate Built-up estimate Built-up estimate Distributors (2) Distributors (2) Distributors (2) Distributors (3) Distributors (4) Distri	N/A 1 N/A 1 N/A N/A N/A 1 N/A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	SS-585-79 SS-5	(6,585.7) (1,7510.41) (1,7510.	Built-up extinate Sample average Satimate Built-up extinate Sample average Satimate Sample average Satimate Suilt-up extinate Sample average Satimate Built-up extinate Built-	565857-95 1920 19	NIAN NIAN NIAN NIAN NIAN NIAN NIAN NIAN	\$8.93 N/A \$40.92 N/A \$40.92 N/A \$40.92 N/A \$40.93 N/A \$40.93 N/A \$58.92 N/A \$58.92 N/A \$515.197 N/A \$58.92 N/A \$51.2080 N/A \$51.2080 N/A \$51.21 N/A \$51.21 N/A \$51.92 N/A \$51.92 N/A \$51.92 N/A \$51.92 N/A \$51.92 N/A \$51.92 N/A \$51.93 N/A \$52.93 N/A \$53.93 N/A \$53.93 N/A \$53.93 N/A \$53.93 N/A \$54.97 N/A \$54.97 N/A \$54.97 N/A	See notes	SCI's workpaper IMC for electric hyers is \$2,235 mil. 500 REV workpaper IMC for gar is \$2,235 mil. 500 REV workpaper IMC for gar is \$2,250 mil. 500 REV workpaper IMC for gar investigation of the second sec
File, VSP (evap-cooled, retrofit) File, VSP & VS (evap-cooled, retrofit) Food Service Electric fryer Gas fryer Electric convection oven (full size) Electric convection oven (full size) HVAC Maintenance Duct Testing and Sealing Refrigerant Charping and Adjustment Evaporator Coil Cleaning (nonres) Condenser Coil Cleaning (nonres) Economizer repair Water Heating	169, 170-172, 10049, 10050, 10055, 10055, 10055, 10055, 10051, 10052, 10051, 10055, 10051, 10	Per discharge group Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit Per unit Per unit Per dwelling Per ton cooling served Per ton cooling served Per ton cooling served	Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Labor Total Materials Labor Total Labor Total Materials Labor Total To	Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate Built-up estimate Distributors (2) Distributors (3) Distributors (4) Distributors (5) Distributors (6) Distributors (7) Distributors (7) Distributors (8) Distributors (9) Distributo	N/A 1 N/A 1 N/A N/A N/A 1 N/A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	September Sept	(6,585.7) 6 (6,585.7) 6 (7,75) 10,41 (8,10,10) 6 (8,10	Built-up estimate Sample average Estimate Built-up estimate Sample average Estimate Built-up estimate Sample average Estimate Built-up estimate Built-up estimate Baseline average Matched pair IMC Sample average	565857.95 19.00	NIAN NIAN NIAN NIAN NIAN NIAN NIAN NIAN	\$8.93 N/A \$40.92 N/A \$40.92 N/A \$40.92 N/A \$40.92 N/A \$40.93 N/A \$58.92 N/A \$58.92 N/A \$515.197 N/A \$58.92 N/A \$51.2080 N/A \$51.2080 N/A \$51.21 N/A	See notes	SCT's workpaper IMC for electric hyers 15.2.236/mil. 5006EV workpaper IMC 16.2.236/mil. 5006EV workpaper IMC 16.2.256/mil. 5006EV workpaper IMC 16.2.256/mil. 5006EV workpaper IMC 16.2.256/mil. 5006EV 16.2.256/mil. 5006E
FIP, VSP (evap-cooled, retrofit) FIP, VSP & VS (evap-cooled, retrofit) FROM Service Electric fryer Gas fryer Electric convection oven (full size) HVAC Maintenance Duct Testing and Sealing Refrigerant Charging and Adjustment Evaporator Coil Cleaning (nonres) Condenser Coil Cleaning (nonres) Economizer repair Water Heating Fipe insulation (SHW)	169, 170-172, 10049, 10050, 10051, 10051, 10051, 10051, 10051, 10061, 10061, 10061, 10061, 10061, 10061, 10061, 10061, 10075, 10061, 10075, 10061, 10075, 10061, 10075, 10	Per discharge group Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit Per unit Per unit Per dwelling Per ton cooling served Per ton cooling served Per ton cooling served	Total Materials Labor Total Materials Labor Total Materials Labor Total Total Materials Labor Total Total Materials Labor Total Total Total Materials Labor Total Total	Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate Built-up estimate Distributors (2) Distributors (3) Distributors (4) Distributors (5) Distributors (6) Distributors (7) Distributors (7) Distributors (8) Distributors (9) Distributo	N/A	September Sept	(A. S. S. S. P. S.	Built-up estimate Sample average Estimate Built-up estimate Sample average Estimate Built-up estimate Sample average Estimate Built-up estimate Built-up estimate Baseline average Matched pair IMC Baseline average Sample average	563857.95	NIAN NIAN NIAN NIAN NIAN NIAN NIAN NIAN	\$8.93 N/A \$40.92 N/A \$40.92 N/A \$40.92 N/A \$40.93 N/A \$40.93 N/A \$58.92 N/A \$58.92 N/A \$515.197 N/A \$58.92 N/A \$51.208 N/A \$51.208 N/A \$51.521 N/A \$51.721 N/A \$51.721 N/A \$51.731 N/A	See notes	SCT's workpaper IMC for electric hyers 15.2.236/mil. 5006EV workpaper IMC 16.2.236/mil. 5006EV workpaper IMC 16.2.256/mil. 5006EV workpaper IMC 16.2.256/mil. 5006EV workpaper IMC 16.2.256/mil. 5006EV 16.2.256/mil. 5006E
FIP, VSP (evap-cooled, retrofit) FIP, VSP & VS (evap-cooled, retrofit) FOOD Service Electric fryer Electric convection oven (full size) Electric convection oven (full size) HVAC Maintenance Duct Testing and Sealing Refrigerant Charging and Adjustment Evaporator Coil Cleaning (nonres) Condenser Coil Cleaning (nonres) Economizer repair Water Heating Pipe Insulation (SHW) Pipe Insulation (SHW)	169, 170-172, 10049, 10050, 10055, 10055, 10055, 10056, 10061, 10062, 10064, 10071, 100141, 100179 143, 144, 1179, 10045-10048, 10051-10054, 10075-10054, 100175 100119, 100120 9049, 100056, 100152, 100153 100066, 100067	Per discharge group Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit production capacity (lbs/hr) Per unit Per unit Per unit Per ton cooling served Per ton cooling served Per ton cooling served Per tion cooling served	Total Materials Labor Total Materials Labor Total Labor Labor Total Labor Labor Labor Total Labor Labo	Built-up estimate Distributors Estimate Built-up estimators Estimate Built-up estimators Estimate Built-up estimators Oistributors (2) Distributors (3) Distributors (2) Distributors (2) Distributors (3) Distributors (2) Distributors (3)	N/A 1 N/A 1 N/A N/A N/A 1 N/A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	September Sept	(A. S. S. S. P. S.	Bullt-up extinate Sample average Sationate Bullt-up extinate Sample average Sationate Sample average Sationate Bullt-up extinate Sample average Measure average Sample average	65887.9 67.0	NIAN NIAN NIAN NIAN NIAN NIAN NIAN NIAN	\$8.93 N/A \$40.92 N/A \$40.92 N/A \$40.98 N/A \$40.98 N/A \$515.10 N/A \$58.92 N/A \$515.10 N/A \$58.92 N/A \$51.089 N/A \$51.089 N/A \$51.089 N/A \$51.089 N/A \$51.921 N/A \$51.921 N/A \$51.921 N/A \$51.93 N/A N/A N/A N/A N/A N/A N/A N/A N/A S14.10 N/A	See notes	SCT's workpaper IMC for electric hyers 15.2.23/m.it.5006Er workpaper IMC 15.2.23/m.it.5006Er workpaper IMC 15.2.23/m.it.5006Er workpaper IMC 15.2.25/m.it.5006Er workpaper 15.2.25/m
File, VSP (evap-cooled, retrofit) File, VSP & VS (evap-cooled, retrofit) Frood Service Electric fryer Gas fryer Electric convection oven (full size) HVAC Maintenance Duct Testing and Sealing Refrigerant Charging and Adjustment Evaporator Coil Cleaning (nonres) Condenser Coil Cleaning (nonres) Economizer repair Water Heating Fipe insulation (steam) Lowflow Showerheads Pool covers (nonres) Appliances & Electronics	169, 170-172, 10049, 10050, 10051, 10051, 10051, 10051, 10051, 10062, 10061, 10062, 10061, 10062, 10063-10070, 100134, 100135 100119, 100120 9049, 100056, 100152, 100153 100068, 100069, 100070, 100071 100068, 100069, 100070, 100071	Per discharge group Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit Per unit Per unit Per dwelling Per ton cooling served	Total Materials Labor Materials Labor Total Materials Materials Materials	Built-up estimate Stributors Estimate Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate Built-up estimate Distributors (2) Distributors (3) Distributors (2) Distributors (2) Distributors (3) Distribut	BV/A 1 1 1 N/A 1 1 1 N/A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	September Sept	6.585.79 2.2712.77 34 4.134.66 4	Bullt-up extinate Sample average Estimate Bullt-up extinate Sample average Estimate Sample average Estimate Sample average Estimate Bullt-up extinate Baseline average Measura everage Sample average	56.985.79	NIAN NIAN NIAN NIAN NIAN NIAN NIAN NIAN	\$8.93 N/A \$40.92 N/A \$40.92 N/A \$40.92 N/A \$40.98 N/A \$515.10 7 N/A \$58.92 N/A \$515.10 7 N/A \$58.92 N/A \$512.089 N/A \$51.089 N/A \$51.089 N/A \$51.089 N/A \$51.089 N/A \$51.081 N/A \$52.081 N	See notes	SCT's workpaper IMC for electric hyers 13.2.255.ml. SOGET workpaper IMC for all social contents of the social cont
File, VSP (evap-cooled, retrofit) File, VSP & VS (evap-cooled, retrofit) Frood Service Electric fryer Gas fryer Electric convection oven (full size) Gas convection oven (full size) HVAC Maintenance Duct Testing and Sealing Refrigerant Charging and Adjustment Evaporator Coil Cleaning (nonres) Economizer repair Water Heating Pipe Insulation (SHW) Pipe Insulation (SHW) Pipe Insulation (SHW) Pool covers (nonres) Appliances & Electronics Network Power Management Software	9100 169, 170-172, 10049, 10050, 10055, 10055, 10056, 10061, 10062, 10051, 10065, 10061, 10062, 10061, 10075, 10061, 10075, 10061, 10075, 100119, 100019, 100074, 100006, 100004, 100005	Per discharge group Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit Per unit Per unit Per discharge group Per ton cooling served	Total Materials Labor Total Materials Material	Built-up estimate Statinate Built-up estimate Constractors (2) Distributors (2) Distributors (2) Distributors (3) Distributor	BV/A 1 1 1 N/A 1 1 1 N/A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	September Sept	(6.585.79 (7.510.41 (7.510.41 (7.510.41 (7.510.41 (7.510.41 (7.510.41 (7.510.41 (7.510.41 (7.510.41 (7.510.41 (7.61	Built-up estimate Sample average Estimate Built-up estimate Sample average Estimate Built-up estimate Sample average Estimate Built-up estimate Built-up estimate Baseline average Matched pair IMC Sample average	563857.95	N/A	\$8.93 N/A \$40.92 N/A \$40.93 N/A \$	See notes	SCE's worspaper IMC for a letter is hyers is 52,235 Auri, SOGET is worspaper IMC for gas is 52,235 Auri, SOGET is worspaper IMC for gas in the electric fyers is 152,105. SOGET is soft in the electric fyers is 152,055 Auri, SOGET in the soft in the electric fyers in 152,055 Auri, SOGET in the SOGET in 152,055 Auri, SOGE
FIRE, VSP (evap-cooled, retrofit) FIRE, VSP & VS (evap-cooled, retrofit) FROM SERVICE Electric fryer Gas fryer Electric convection oven (full size) HVAC Maintenance Duct Testing and Sealing Refrigerant Charging and Adjustment Evaporator Coil Cleaning (nonres) Condenser Coil Cleaning (nonres) Economizer repair Water Heating Fipe insulation (steam) Lowflow Showerheads Pool covers (nonres) Appliances & Electronics Network Power Management Software Refrifreezer Recycling (res)	169, 170-172, 10049, 10050, 10055, 10055, 10055, 10056, 10051, 10062, 10054, 10074, 100135 100119, 100120 100119, 100120 100066, 10006	Per discharge group Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit Per unit Per unit Per dwelling Per ton cooling served	Total Materials Labor Total Materials Material	Built-up estimate Stributors Estimate Built-up estimate Distributors Estimate Built-up estimate Distributors Estimate Built-up estimate Distributors (2) Distributors (3) Distributors (2) Distributors (2) Distributors (3) Distribut	BV/A 1 1 1 N/A 1 1 1 N/A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	September Sept	(6.585.79 (1.75)	Bullt-up extinate Sample average Estimate Bullt-up extinate Sample average Estimate Bullt-up extinate Sample average Estimate Bullt-up extinate Busilt-up extinate Bu	\$65857.95 \$4.772.67 \$5.772.77 \$5.772.67 \$7.764.77 \$7.7	N/A	\$8.93 N/A \$40.92 N/A \$40.93 N/A \$	See notes	1927's workpaper IMC for electric hyers 19.2.235'ALT. SOBER's workpaper IMC 19.2.235'ALT. SOBER's workpaper IMC for pa 19.2.235'ALT. SOBER's Manual Pa 19.2.2
File, VSP (evap-cooled, retrofit) File, VSP & VS (evap-cooled, retrofit) Frood Service Electric fryer Gas fryer Electric convection oven (full size) Gas convection oven (full size) HVAC Maintenance Duct Testing and Sealing Refrigerant Charging and Adjustment Evaporator Coil Cleaning (nonres) Economizer repair Water Heating Pipe Insulation (SHW) Pipe Insulation (SHW) Pipe Insulation (SHW) Pool covers (nonres) Appliances & Electronics Network Power Management Software	9100 169, 170-172, 10049, 10050, 10055, 10055, 10056, 10061, 10062, 10051, 10065, 10061, 10062, 10061, 10075, 10061, 10075, 10061, 10075, 100119, 100019, 100074, 100006, 100004, 100005	Per discharge group Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit Per unit Per unit Per dwelling Per dwelling Per ton cooling served	Total Materials Labor Total Materials Labor Total Materials Total (2+ units) Tota	Built-up estimate Statinate Built-up estimate Constractors Distributors (2) Distributors (2) Distributors (2) Distributors (3) Distributors (3	N/A	September Sept	(6.585.79 (1.75)	Bullt-up extinate Sample average Estimate Bullt-up extinate Sample average Estimate Bullt-up extinate Sample average Estimate Bullt-up extinate Busilt-up extinate Busilt-up extinate Busilt-up extinate Busilt-up extinate Baseline average Matched pair-IMC Baseline average Sample average	563857-95 13201-01 134658-1	NIAN NIAN NIAN NIAN NIAN NIAN NIAN NIAN	\$8.93 N/A \$40.92 N/A \$40.92 N/A \$90.98 N/A \$90.98 N/A \$5151.97 N/A \$68.92 N/A \$520.89 N/A \$512.089 N/A \$51.2089 N/A \$51.2080 N/A \$52.958 S92.358 N/A \$52.958 S92.358 N/A \$52.258 S92.358	see notes see no	ISCN workpaper IMC for electric types 13.2.235-(mil. 500-EN workpaper IMC for electric types 15.1.235-(mil. 500-EN workpaper IMC for part of electric types 15.1.255-(mil. 500-EN workpaper IMC for part of types 15.1.256-(mil. 500-EN workpaper IMC for electrometric Systems IMC analysis and values for part oliver for event IMC analysis and values for part oliver for electrometric Systems IMC analysis and values for part of the electr
FIP, VSP (evap-cooled, retrofit) FIP, VSP & VS (evap-cooled, retrofit) FOOD Service Electric fiver Electric convection oven (full size) Electric convection oven (full size) HVAC Maintenance Duct Testing and Sealing Refrigerant Charging and Adjustment Evaporator Coil Cleaning (nonres) Condenser Coil Cleaning (nonres) Economizer repair Water Heating Pipe Insulation (SHW) Pipe Insulation (SHW) Fipe Insulation (SHW) Refrigerace & Electronics Network Power Management Software Ref/freezer Recycling (res) Ref/freezer Recycling (res)	9100 169, 170-172, 10049, 10050, 10055, 10055, 10056, 10061, 10062, 10051, 10065, 10061, 10062, 10061, 10075, 10061, 10075, 10061, 10075, 100119, 100019, 100074, 100006, 100004, 100005	Per discharge group Per discharge group Per discharge group Per unit production capacity (lbs/hr) Per unit Per unit Per unit Per dwelling Per dwelling Per ton cooling served	Total Materials Labor Total Materials Material	Built-up estimate Statinate Built-up estimate Constractors Distributors (2) Distributors (2) Distributors (2) Distributors (3) Distributors (3	BMA 1 1 N/A	September Sept	6.585.79 (6.585.79 (7.75)0.41 (8.75)0.4	Built-up estimate Sample average Estimate Built-up estimate Sample average Estimate Built-up estimate Built-up estimate Built-up estimate Built-up estimate Buseline average Matched pair IMC Baseline average Sample average	\$65857.95 \$4.772.67 \$5.772.77 \$5.772.67 \$7.764.77 \$7.7	NIAN NIAN NIAN NIAN NIAN NIAN NIAN NIAN	\$8.93 N/A \$40.92 N/A \$40.93 N/A \$	See notes	ISCN workpaper IMC for electric types 13.2.235-(mil. 500-EN workpaper IMC for electric types 15.1.235-(mil. 500-EN workpaper IMC for part of electric types 15.1.255-(mil. 500-EN workpaper IMC for part of types 15.1.256-(mil. 500-EN workpaper IMC for electrometric Systems IMC analysis and values for part oliver for event IMC analysis and values for part oliver for electrometric Systems IMC analysis and values for part of the electr

Cost Case Reporting Table

Cost Case Reporting Table												Incremental Cost Reporting Tab	de .										
Cost Case Description	Cost Case ID	Program Delivery Strategies	Material Coxt	Installation Man Hours - Retrofit	Installation Labor Cost Retrofit	Installation Man Hours - New		Climate Labor Multiplier Reference	Labor Base Wage Rate Reference	Norm alizing Unit		Program Delivery Strategies	Measure Material Cost Case ID	Measure Material Cost	Base Case -Code/Standard Cor Case ID	Sase Case - et Code/Standard Material Cost	Base Case - Code/Standard Incremetral Material Cost		Base Case - Market Average Material Cost	Market Average Incremetrial Material Coat	Base Case -Customer Average Cost Case ID	Base Case - Customer Average Material Cos	n Ar
sucet Aerators - 0.5 galiminute	HWU-0p5G	Downstream Prescriptive Rebates/Incentives	\$6.54	50.12	\$6.70	TBD	TBD	PL50	R-DHW-LF	Unit	1	Downstream Prescriptive Rebates/In	HWU-065G	26.54	Faucet Aerators - 2.2 caliminute	\$3.7	\$2.6	O none specified	600	900	No Faucet Aerators	\$0.0	.00
Low Flow Showerhead - 0.25 gallminute	MMU-LI-Op25gpm	Downstream Prescriptive Rebates/Incentives	529.22	\$0.30	\$16.74	TBD	TBD	PL50	R-DHW-LF	Unit	1	Downstream Prescriptive Rebates/In	HWU-065G	\$6.54	Faucet Aerators - 2.2 caliminute	\$3.7	52.6	O none specified	600	6 500	A No Faucet Aerators	50.0	.00
Succet Aerators - 0.5 galiminute	HWU-0p5G	Downstream Prescriptive Rebates/Incentives	\$6.54	50.12	\$6.70	TBD	TBD	PL50	R-DHW-LF	Unit	1	Downstream Prescriptive Rebates/In	HWU-LI-0x25ccm	529.22	showerhead - 2.5 gal/minute	\$14.3	\$14.9	O none specified	600	6 500	Sandard Showerhead	50.0	.00
Low Flow Showerhead - 2.5 cal/minute	MWU-LI-Op2p5gpm	Downstream Prescriptive Rebates/Incentives	529.22	50.30	\$16.74	TRO	TRID	ER 50	R-DHW-LF	199	1	Downstream Prescriptive Rebates/In	HMI LI LONDYSON	529.22	showerhead - 2.5 gal/minute	579.7	50.0	O Inone specified	450	4 600	Standard Showerhead	500	00
Code Standard - show enhead - 2.5 call minute	showerhead - 2.5 galiminute	Downstream Prescriptive Rebates/Incentives	\$14.32	\$0.30	\$16.74	TBD	TBD	PL50	R-DHW-LF	Uhit							-						_
Code Standard - Faucet Aerators - 2.2 gal/minute	Faucet Aerators - 2.2 gal/minute	Downstream Prescriptive Rebates/Incentives	\$3.74	50.30	\$16.74	TRO	TRID	PL50	D.DHWLI E	199	1												
			-		4.2.1					-													
						Aerator:	\$13.2																
	Labor Base Wage Rate Table							\$31.00															
			Measure	Measure	Program Delivery	Saxe Labor	1																
	Reference	Sector	Category	Subcategory	Strategies Downstream Prescriptive	Rate																	
	BOWLF	Residential	Domestic Hot Wate	Water Conservation	Rebates/Incentives	549	l																
						410																	
	Climate Multiplier Table: PL50																						
	Climate Zone	Reference City	Material	Installation																			
	1	Dureka	0.96	1.13																			
	2	Senta Rosa	0.96	1.47																			
	3	San Francisco	1.00	1.40																			
	4	San Jose	1.00	1.35																			
	5	San Luis Obispo	0.96	1.07																			
	6	Senta Barbora	100	1.08																			
	7	San Diago	100	1.05																			
		Senta Ana	0.96	1.07																			
		Los Angeles	100	1.05																			
	10	Byeraide	100	1.05																			
	"	Redding	1.00	1.00																			
	12	Secramento	1.00	1.10																			
	13	Danno	1.00	1.16	1																		
	14	Maine	0.96	1.04	1																		
	15	Palm Springs	0.96	1.07	1																		
	16	Sugaryle	0.96	1.00	1																		
			0.903	1145																			
	Av	erage	v.983	1.146																			