

DOCKETED

Docket Number:	15-AAER-05
Project Title:	Residential Lavatory Faucets and Showerheads
TN #:	205620
Document Title:	NRDC Comments on Residential Lavatory Faucets and Showerheads
Description:	N/A
Filer:	System
Organization:	NRDC/Tracy Quinn
Submitter Role:	Public
Submission Date:	7/31/2015 3:51:31 PM
Docketed Date:	7/31/2015

Comment Received From: Tracy Quinn

Submitted On: 7/31/2015

Docket Number: 15-AAER-05

NRDC Comments_Residential Lavatory Faucets and Showerheads

Additional submitted attachment is included below.



July 31, 2015

Docket Unit
California Energy Commission
Docket No. 15-AAER-01
1516 9th Street, MS-4
Sacramento, CA 95814

RE: DOCKET #15-AAER-05 Appliance Efficiency Rulemaking for Residential Lavatory
Faucets and Showerheads

Dear Commissioners and Energy Commission staff,

On behalf of the Natural Resources Defense Council (NRDC), I submit these comments on the Title 20 Appliance Efficiency Rulemaking for residential lavatory faucets and showerheads.

RESIDENTIAL LAVATORY FAUCETS

The product standard for residential lavatory faucets adopted on April 8, 2015 during an emergency rulemaking is appropriate and achievable with the original implementation date of January 1, 2016 for most faucet types currently on the market.

Flows are regulated in residential lavatory faucets by one of two ways, with a threaded outlet that can be fitted with an aerator and an open flow style where the flow control mechanism is located within the fitting. For the threaded faucets, the manufacturers can simply affix a conforming aerator to a base fitting to meet the 1.2 gpm standard - as demonstrated in the July 28, 2015 workshop. Per testimony of the manufacturers at the July 28, 2015 Commission Workshop, these ***threaded faucets account for 90% or more of their product lines.***

Perceived Barriers to Compliance by January 1, 2016

In the July 28, 2015 CEC workshop, the manufacturers and retailers noted the following barriers in meeting the January 1, 2016 deadline:

- Manufacturers:
 - Modification of the stamps that label the fixtures with the designed maximum flow rate

- Updates to the package labels
- For some open flow faucets, modification of product design
- Potential bottleneck for the distribution of conforming aerators by NeoPerl.
- Retailers:
 - Difficult to implement during the holiday season due to high volume business and administrative workload with taxes, etc.

It should be noted that the 1.2 gpm standard was adopted on April 8, 2015 under and emergency rulemaking giving the manufacturers sufficient time to make these changes before January 1, 2106 for the vast majority of their product lines. In order to accommodate retailers' concern about implementing the new standard during the holiday period and mitigate manufacturer concerns about potential bottlenecks at NeoPerl, NRDC is amenable to pushing the implementation date for threaded faucets and aerators to February 1, 2016.

Sell-through Options

The manufacturers and retailers have requested the option for sell-through of non-conforming products after the effective dates for new standards to ensure that sufficient products are available in retail outlets and to eliminate the need for retailers to ship the non-conforming products to stores in other states or back to the manufacturers. Permitting retailers to sell through existing inventory of non-conforming products manufactured prior to the effective date will have a ripple effect on water consumption, because residential lavatory faucets can remain in use for 10 or more years. Additionally, NRDC is concerned that, without a sunset date for the sell-through option, retailers could continue to receive non-conforming products from out-of-state stores or wholesalers indefinitely. Since California is likely to be the only state implementing a standard for residential lavatory faucets at 1.2 gpm during this time frame, products with maximum flow greater than 1.2 gpm will be readily available outside of California and we need to ensure that these non-conforming fixtures do not make it into the California market. With California taking the lead with this standard, it also means there will be plenty of retailers outside of the state that can accept any remaining non-conforming fixtures after the standard goes into effect.

Summary of NRDC's Residential Lavatory Faucet Recommendations

NRDC proposes the following implementation schedule for products sold or offered for sale in California to move expeditiously to achieve water savings while accommodating the concerns presented by the plumbing manufacturers and home improvement retailers.

- September 1, 2015 – lavatory faucets and lavatory faucet aerators: maximum flow rate of 1.5 gpm rated at 60 psi; sell-through of non-conforming products manufactured before this date permitted.

- February 1, 2016 – threaded lavatory faucets and lavatory faucet aerators: maximum flow rate of 1.2 gpm rated at 60 psi; sell-through of non-conforming products manufactured before this date permitted.
- July 1, 2016 – all lavatory faucets and lavatory faucet aerators : maximum 1.2 gpm rated at 60 psi; sell-through of non-conforming products manufactured before this date permitted..
- [If sell-through is permitted] October 1, 2016 -- all lavatory faucets and lavatory faucet aerators: maximum 1.2 gpm rated at 60 psi, regardless of date of manufacture (i.e. allowances for sell-through shall sunset by this date).

In order to implement this standard, NRDC proposes that CEC provide a definition for “threaded faucet”, such as the following:

“Threaded lavatory faucet” means a lavatory faucet with an outlet that is threaded to accept an aerator or any similar accessory that serves to regulate the flow of the faucet.

SHOWERHEADS

NRDC supports the two-tiered standard for showerheads proposed by the Investor Owned Utilities and supported by the docketed CASE report. As proposed, the two-tier approach offers 60% additional water savings over the CEC staff proposal. The adoption of the WaterSense standard in 2010 has resulted in the availability of significantly more high-efficiency showerheads on the market and improved customer satisfaction. According to the CEC staff report, 31% of the 4,398 showerheads in the Energy Commission Appliance Database have a maximum flow rate of 2.0 gpm or less. Adopting a two-tier standard at this time is important because there will not be another opportunity to implement an updated standard until 2021 if the revised standard goes into effect in 2016. In the July 28, 2015 workshop, the manufacturers agreed that sufficient product would be available for a stricter standard to be implemented in a shorter timeframe. Additionally, technology to improve potential customer satisfaction issues associated with high efficiency showerheads, such as temperature shifts, is currently available and could be demonstrated to be effective for maximum flowrates of 1.8 gpm or lower in the next few years.

In the workshop, the manufacturers suggested that a second tier standard of 1.75 gpm effective four years from the implementation date of the 2.0 gpm Tier 1 standard would be acceptable. While NRDC believes that the second tier standard as proposed by the IOU Team is achievable, due to the expedited rulemaking process NRDC would support CEC staff in setting a second tier standard of 1.8 gpm effective 3 years after the 2.0 gpm Tier 1 implementation as a compromise.

Sell-through Options

As with residential lavatory faucets, the manufacturers and retailers have requested the option for sell-through of non-conforming showerhead products after the effective dates

for new standards to ensure that sufficient products are available in retail outlets and to eliminate the need for retailers to ship the non-conforming products to stores in other states or back to the manufacturers. Permitting retailers to sell through existing inventory of non-conforming products manufactured prior to the effective date will have a ripple effect on water consumption, because residential lavatory faucets can remain in use for 10 or more years. Additionally, NRDC is concerned that, without a sunset date for the sell-through option, retailers could continue to receive non-conforming products from out-of-state stores or wholesalers indefinitely. Since California is likely to be the only state implementing a standard for showerheads at 2.0 gpm during this time frame, products with maximum flow greater than 2.0 gpm will be readily available outside of California and we need to ensure that these non-conforming fixtures do not make it into the California market. With California taking the lead with this standard, it also means there will be plenty of retailers outside of the state that can accept any remaining non-conforming fixtures after the standard goes into effect.

Showerhead Technology

Temperature Shifts

In new buildings, the California Plumbing Code requires installation of a temperature- or pressure-balancing shower mixing valve and further that the rated flow of the mixing valve be compatible with the flow rate of the shower.

408.3 Individual Shower and Tub-Shower Combination Control Valves. Showers and tub-shower combinations shall be provided with individual control valves of the pressure balance, thermostatic, or combination pressure balance/thermostatic mixing valve type that provide scald and thermal shock protection for the rated flow rate of the installed showerhead.

Mixing vales are on the market today that provide thermal protection for showerheads flowing at 1.5 gpm. See Attachment A.

In existing buildings, the susceptibility of showers to thermal shifts varies considerably. While the potential for temperature shifts in showers is widespread, the magnitude of such shifts varies greatly, from minor annoyance to potentially hazardous. The potential for thermal shock is more prevalent in buildings that were built before 1987 when codes began requiring thermal mixing valves. However, even in older buildings, the magnitude of temperature shifting is influenced by plumbing fixture location and piping configuration within buildings, and may not be severe in buildings without thermal mixing valves. The widespread distribution of showerheads with maximum flow rates of 1.5 gpm in California utility programs affirms that hazardous temperature shifting is not commonly encountered in the existing building stock.

Where consumers or building owners may be concerned with the potential for a new high-efficiency showerhead to raise the possibility of a scaling hazard, an easily

installed in-line product is commercially available -- the temperature actuated flow reducing (TAFR) valve. Such products are designed to meet performance testing to prevent scalding, as prescribed in ASSE 1062-2006. Currently, the cost of such products is in the range of \$40. However, the performance of high-efficiency showerheads is so highly cost-effective that even a consumer that purchases a TAFR valve to accommodate a new showerhead will save money on a life-cycle basis. For more on TAFR valves, see Attachment B.

According to a 2012 White Paper by The American Society of Sanitary Engineering (ASSE) titled, *Scald Hazards Associated with Low-Flow Showerheads*¹, “the maximum flow rate of a showerhead should be matched with an automatic compensating shower valve with a minimum flow rate equal to or lower than that of the showerhead, both of these flow rates will be quoted at 45 psi.”

Because it is important for the automatic compensating shower valve to be compatible to the flow rate of the showerhead, NRDC recommends that the rated flow of mixing valves be reported to CEC and included in the Energy Commission Appliance Database by model number. The minimum flow rate at 45 psi should also be labeled on packaging. This would allow compatibility of the valve with the showerhead to be determined at the design stage, rather than at the job site. Furthermore, it will be important to track the quantity of mixing valves rated for high efficiency showerheads leading up to the implementation of the second tier.

Variable Orifice Showerheads

Variable orifice products are pressure-compensating and designed to deliver very nearly the same flow rate across all water pressures typically encountered in buildings. This is hugely important for ensuring customer satisfaction, given stated customer preferences for sufficient flow as well as other attributes such as spray pattern. These products are on the market today and perform quite well. Variable orifice technology will be a key enabler of lower maximum flow rates in the future, including the proposed Tier 2 rate of 1.8 gpm, because it will ensure that a typical user actually gets 1.8 gpm, rather than 30 or 40 % less than that at locations on the lower end of the spectrum of acceptable water pressure

Variable orifice product will likely play a significant role in consumer satisfaction, therefore NRDC recommends updating the Energy Commission Appliance Database for showerheads to include a column for orifice type.

¹ <http://www.asse-plumbing.org/Scaldhazards.pdf>

Summary of NRDC's Showerhead Recommendations

- Product Standard
 - January 1, 2016 – Tier 1; showerheads; maximum flow rate 2.0 gpm at 80 psi, 75% maximum flow rate at 45 psi, 60% maximum flow rate at 20 psi
 - January 1, 2018 – Tier 2; showerheads; maximum flow rate 1.8 gpm at 80 psi, 75% maximum flow rate at 45 psi, 60% maximum flow rate at 20 psi
 - As noted above, NRDC would support an effective date for Tier 2 of January 1, 2019
- Mixing Valve Labeling and Reporting Requirements
 - Require minimum rated flow for mixing valves to be reported in the Energy Commission Appliance Database
 - Require minimum rated flow for mixing valves to be labeled on packaging
- Update Energy Commission Appliance Database to include column to describe type of orifice (fixed or variable)

Thank you for the opportunity to provide comments on this important rulemaking.

Best regards,

A handwritten signature in black ink, appearing to read "Tracy Quinn", with a stylized flourish at the end.

Tracy Quinn, P.E.
Policy Analyst
Natural Resources Defense Council

Attachment A: Temperature Actuated Flow Reduction (TAFR) Valves for Showerhead Fittings – A Summary

Temperature Actuated, Flow Reduction (TAFR) Valves for Showerhead Fittings – A Summary by John Koeller, P.E.

Function: TAFR “valves automatically reduce discharge flow to trickle if water temperature exceeds a preset limit.”¹

TAFR valves reduce the risk of scalding by automatically (and rapidly) reducing the showerhead flow in response to an outlet temperature greater than a preset actuation temperature. They are then reset by allowing cold water to run through the device. It should be noted that TAFRs do not offer thermal shock protection, but they are an inexpensive way to protect against scald injuries in older buildings without automatic compensating shower valves, especially those with two handle shower valves.

It should be noted that in addition to showerheads, TAFRs are also used to limit exposure to high temperature water discharged from other individual supply fittings, such as bath and utility faucets, and sink and lavatory faucets². See Table 1.

Applicable American National Standard: ASSE³ 1062-2006 (product standard)

Specification: The ASSE 1062-2006 product standard mandates an actuation temperature not to exceed 120°F (a number of models set 117°F as their shut-off threshold). Once actuated, a TAFR valve is required to reduce water flow to a 0.25 gallon per minute (gpm) trickle flow within five (5) seconds. The tests to determine compliance with the standard are pass-fail tests and no reporting of performance data on individual product models is made available.

The manufacturer sets the actuation temperature for each unit at the factory and subsequent adjustment is not possible.

Mechanism: To perform the flow reduction function, an internal metal alloy inside the TAFR expands when the water temperature reaches 115 - 120°, reducing the water flow to the trickle rate (0.25 gpm), so that scalding hot water does not spray onto the bather.

Bather operation: Once the TAFR actuates as a result of high temperature water, the resulting trickle flow is designed to allow the bather to readjust the controls to a cooler setting and to let the cooler water reset the TAFR valve to the full flow (2.5 gpm or less). To reset, the hot water must be turned off while the cold water is kept on, and the water is then mixed again to a safe temperature. This resetting process usually takes only about 15 - 20 seconds, a small inconvenience considering the device can protect a bather from severe scalding injuries. This is particularly important with the aged and infirm⁴.

¹ ASSE 1062-2006, Forward

² *ibid*, Section 1.1, Application

³ American Society of Sanitary Engineering

⁴ Persons with age-related health issues (e.g., dementia) are at an increased risk for hot water burns as memory loss and lack of judgment increase unsafe behaviors. The person may confuse the hot and cold water handles or forget how to blend the hot and cold water to a safe temperature. Age-related sensory loss and mobility impairments also decrease the person's ability to move out of the way when water is scalding. And older skin is thinner and more susceptible to burns.

Installation: The showerhead TAFR screws on between the showerhead and the typical shower arm.

Product manufacturers:

1. Cash Acme:
http://www.cashacme.com/images/pdf_downloads/products/thermostatics/HG_TAFR/HG_TAFR_Sales.pdf
2. ScaldShield: http://antiscald.com/products/ss_bath.php
3. WATTS: http://www.watts.com/pages/products_details.asp?pid=6249
4. H2otStop (integral with showerhead):
<http://www.h2otstop.com/images/showerheads-spec.pdf>
5. Precision Plumbing Products: http://www.pppinc.net/1/3/temp-de-tech_thermostatic_shower_valve.html

Device cost: List prices range between \$40 and \$50

ASSE 1062-2006 test elements:

1. Leakage test at 250 psi
2. Deterioration test at 200°F
3. Flow rate test for consistency with ASME A112.18.1/CSA 125.1
4. Flow reduction and reset test at various temperatures up to 140°F (see Table 1)
5. Life cycle test to 125,000 warm/cold cycles interspersed with 500 hot cycles at 135°F
6. Hydrostatic pressure test for leakage at 500 psi

Table 1. ASSE 1062 Flow Reduction and Reset Test

<i>Supply fitting >></i>	<i>Showerheads</i>	<i>Bath Tub and Utility Faucets</i>	<i>Sink and Lavatory Faucets</i>
Flow rate before reduction	2.5 gpm ± 0.25 gpm	4.0 gpm ± 0.4 gpm	2.2 gpm ± 0.2 gpm
Supply pressure after reduction	80 psi ± 2.0 psi	80 psi ± 2.0 psi	80 psi ± 2.0 psi
Maximum reduced flow	0.25 gpm	0.25 gpm	0.25 gpm

Pros and Cons of TAFRs for Showerheads:

PROS

- Especially beneficial for apartment dwellers without access to the hot water delivery system.
- Inexpensive and easy to install.
- The water heater can be maintained at higher temperatures to avoid bacterial risk.

CONS

- Maximum hot water temperature is pre-set by manufacturer (although this

- eliminates the risk of after-market tampering).
- Device may turn water off during showering, a minor inconvenience.
- Hot and cold water must be manually remixed after the device reduces the flow to a trickle or the water flow will not be restored.

Additional resources:

http://www.plumbingengineer.com/april_13/code.php#sthash.nlbVW8V0.dpuf

<http://www.hanover.com/risksolutions/pdf/171-0869.pdf>

<http://www.hgexperts.com/article.asp?id=5135>

http://www.ciph.com/themes/ciph_2013/pdfs/waterTemperatureControlAndLimitationAnalysis.pdf

<http://www.scaldprevention.org/Hot%20Water%20Systems%20Controls.htm>

<http://www.scaldprevention.org/>

Attachment B: Examples of Specification Sheets for Mixing Valves



2 Saddleback Cove / P.O. Box 1088
Travelers Rest, SC 29690

B-3404-PBV

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com

This Space for Architect/Engineer Approval

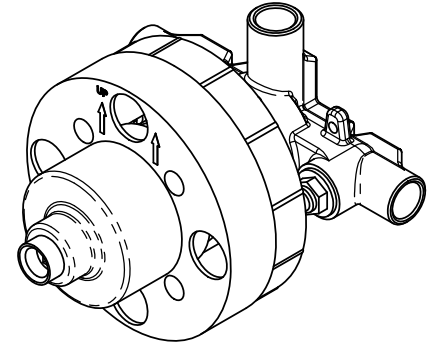
Job Name _____ Date _____

Model Specified _____ Quantity _____

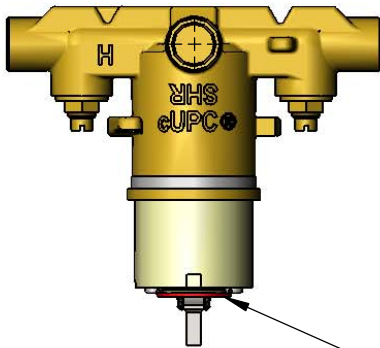
Customer/Wholesaler _____

Contractor _____

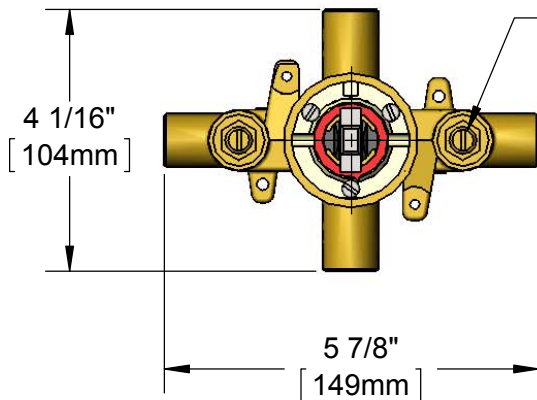
Architect/Engineer _____



Shown Above w/ Plaster Guard

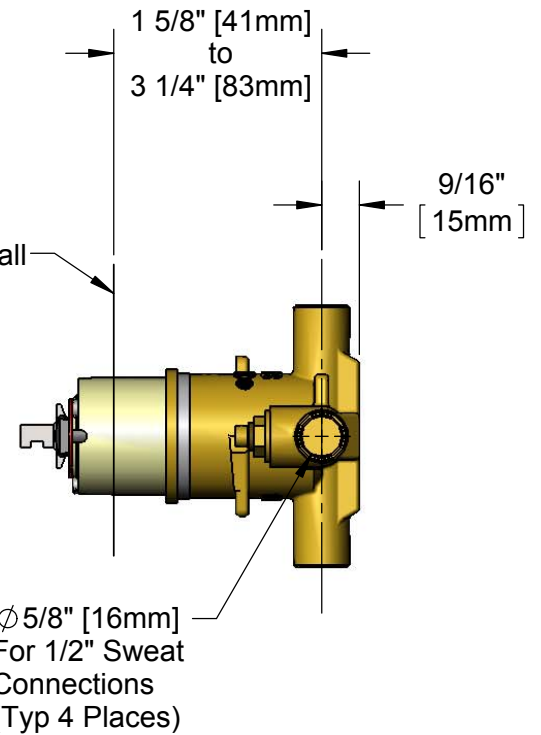


Pressure Balance Cartridge
w/ Volume Control &
Temperature Limit Stop



Integral Screwdriver
Stops

Finished Wall



ϕ 5/8" [16mm]
For 1/2" Sweat
Connections
(Typ 4 Places)

Notes:

1. May Be Used w/ 1.5 GPM Showerheads
2. For B-3400, B-3401 Series Pre-Installation:
 - 018591-45: Bath / Shower Valve Trim Kit w/ 1.5 GPM Showerhead & Tub Spout
 - 018592-45: Shower Valve Trim Kit w/ 1.5 GPM Showerhead Only

Product Specifications:

Pressure Balance Shower Valve Only (ASSE 1016) w/
Volume Control, Temperature Limit Stop, 1/2" Sweat Connections

Drawn

DMH

Checked

KJG

Approved

JHB

Scale:

1:3

Date:

01/09/13



2 Saddleback Cove / P.O. Box 1088
Travelers Rest, SC 29690

B-3304-PBV

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com

This Space for Architect/Engineer Approval

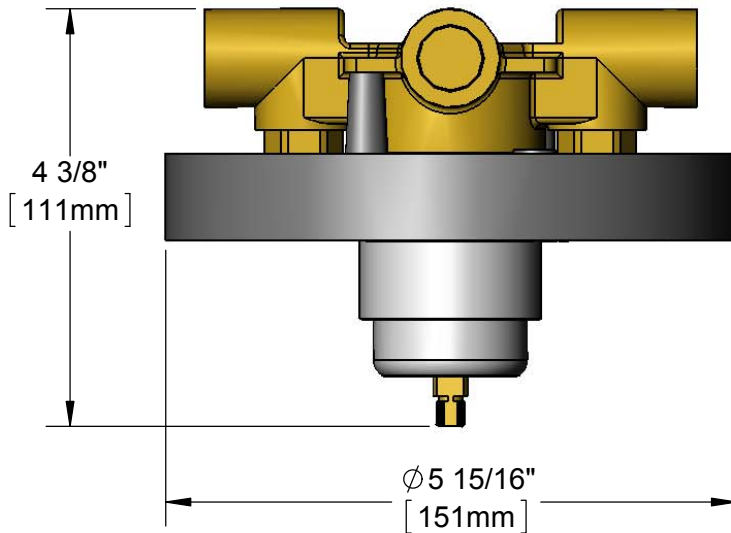
Job Name _____ Date _____

Model Specified _____ Quantity _____

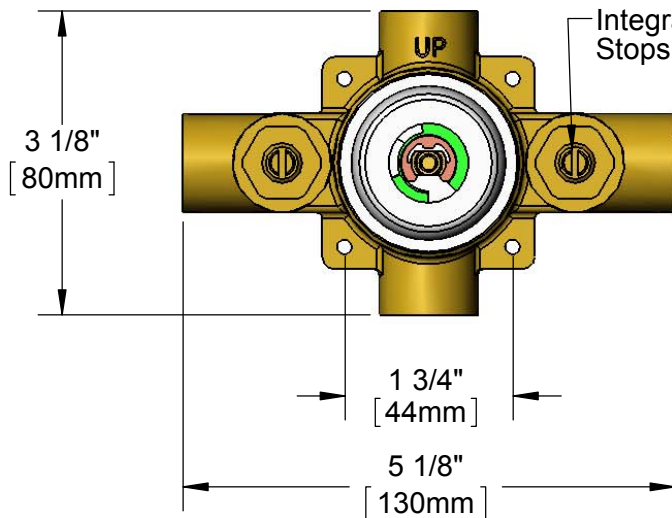
Customer/Wholesaler _____

Contractor _____

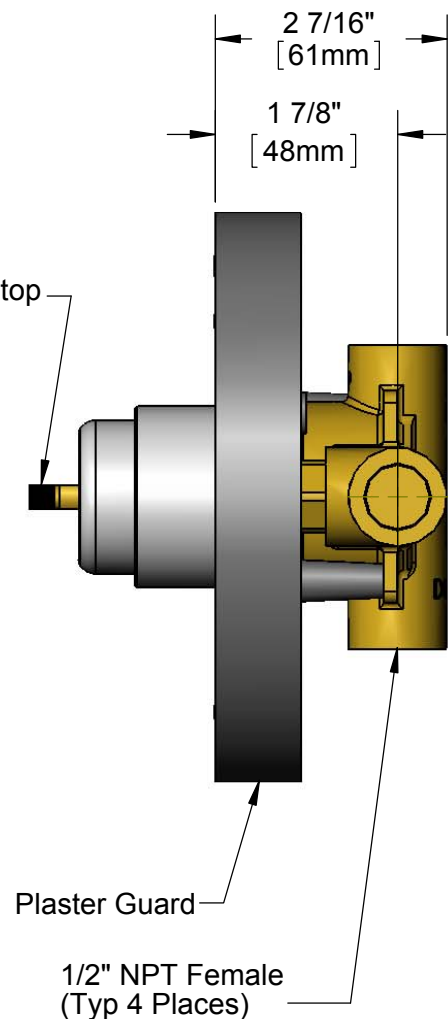
Architect/Engineer _____



017441-45
Pressure Balance
Cartridge Assembly
w/ Temperature Limit Stop



Integral Screwdriver
Stops



1. Precautionary Note: Shower valve should not be utilized with low-flow shower heads
2. For B-3300, B-3301 and B-3304 Pre-Installation:
017443-45 - Handle Assembly,
017444-45 - Cover Plate Assembly,
B-1090 - Showerhead w/ Arm & Escutcheon
017439-45 - Tub Spout w/ Diverter
Sold Separately

Product Specifications:
Pressure Balance Mixing Valve Only, 1/2" NPT Female Connections

Drawn

DMH

Scale:

1-2

Checked

KJG

Approved

JHB

Date:

06/25/13