Fugitive Emissions & US EPA Impact to Industry and Valve Manufacturers

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Federal Judiciary Low-E Consent

Decrees

- Low-E Valves
- Method 21 Leak Monitoring In-situ
- VOC 100 ppmv maximum
- LDAR (Enhanced) Program
- 5 year warranty or performance statement
- Fugitive Emissions have not received this much attention since the Clean Air Act of 1990





	States Environmental Protection	Agency	Es	pañol 中文: 繁體版	中文:简体版 Tiếng Việt 한국(
Learn the Issues	Science & Technology	Laws & Regulations	Laws & Regulations About EPA		Search EPA.gov Q						
Enforcement					Contact Us Share						
Enforcement Home	You are here:	EPA Home » Enforcement » Flint	Hills Resources, Por	t Arthur Clean Air Act Settlem	nent						
Enforcement Basics	Flint	Flint Hills Resources, Port Arthur Clean Air									
Air Enforcement	Act Se	ettlement									
Water Enforcement	(Washington	(Washington, DC – March 20, 2014) The Department of Justice and the U.S. Environmental Protection Agency (EPA) announced today that Flint Hills Resources (FHR) of Port Arthur has agreed to									
Waste, Chemical and Cleanup Enforcement	Agency (EPA										
Criminal Enforcement	implement in equipment a	implement innovative technologies to control harmful air pollution from industrial flares and leaking equipment at the company's chemical plant in Port Arthur. Texas. This settlement is part of EPA's									
Data and Results	national effo	national effort to advance environmental justice by protecting communities such as Port Arthur that									
Policy, Guidance and Publications	have been d penalty for 0	have been disproportionately impacted by pollution. The company is also required to pay a \$350,000 penalty for Clean Air Act violations.									
	 <u>Overview</u> <u>Violations</u> <u>Injunctive</u> <u>Environm</u> 	<u>e Relief</u> ental Mitigation Projects			Settlement Resources Press Release Consent Decree						

- Pollutant Reductions
- Health and Environmental Effects
- <u>Civil Penalty</u>
- Comment
- <u>Contact</u>

<u>Cutting Hazardous Air</u>
 <u>Pollutants</u>



EPA Consent Decrees

- 1. Chemical
- 2. Refining
- 3. Gas





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Broad Range of Industries Requiring Low-E Valves

Industry and Manufacturer Test Standards Cooperation





Company Name	Number of Sites	EPA Region	Date of EPA Action	Enhanced LDAR Required	l Final Penalty Amount	LDAR-only Violations Alleged?
Plaskolite	1	Region 5	12/1/2009	No	3,000	Yes
Solutia Incorporated	1	Region 5	6/29/1905	No	23,794	No
Koppers Inc.	1	Region 3	2011	No	27,000	Yes
Kinder Morgan Liquids Terminal, LLC	1	Region 2	8/10/2010	No	134,270	Yes
Hercules Incorporated	1	Region 5	2008	No	22,500	Yes
Bristol Myers Squibb	1	Region 2	7/24/2008	No	52,000	No
LDH Energy Olefins, LLC	1	Region 6	2010	No	70,000	Yes
Schering Plough Products	1	Region 2	2011	No	260,000	Yes
Hercules Incorporated	1	Region 7	2011	No	245,521	Yes
Dow Reichhold Specialty Latex LLC	1	Region 3	2009	No	300,000	Yes
Koppers Incorporated	1	Region 3	2011	No	301,000	Yes
Sunoco, Inc.	1	Region 5	2009	No	400,000	Yes
Eastman Kodak Company	1	Region 2	2011	No	\$367,685 proposed	Yes
Pfizer	1	National	2008	No	975,000	Yes
Vertellus Agriculture & Nutrition Specialties LLC	1	Region 5	8/21/2009	Yes	425,000	No
Dow Chemical	1	Region 5	2011	Yes	2,500,000	No
Formosa Plastics	2	Region 6	2009	Yes	2,800,000	No
LyondellEquistar	7	National	2007	Yes	2,500,000	No
Ineos ABS USA/Lanxess	1	Region 5	2009	Yes	3,100,000	No
CITGO Petroleum Corporation (East Plant) (National Case)	6	National		Yes	3,600,000	No
Hovensa LLC	1	Region 2	1/26/2011	Yes	5,125,000	No
Shell Chemical, LP (National Case) Shell Chemical LP/Shell Chemical <u>Yabucoa</u> , Inc.	Multiple	National	3/31/2010	Yes	1,806,630	No
Westlake Calvert City	1	Region 4	2010		800,000	No
Invista	12	National	2009	Yes	1,700,000	No

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EPA Air Toxics National Enforcement Initiative

- Leaks
- Flares
- Excess Emissions

EPA has wide variety of leak detection equipment for use at Industrial sites

The EPA is proposing an annual average benzene concentration standard at the refinery fence line, measured using 2-week integrated samples placed around the refinery fence line perimeter.

The EPA is also proposing to require monitoring of air concentrations at the fence line of refinery facilities to ensure proposed standards are being met and that neighboring communities are not being exposed to unintended emissions.



Air pollution from an improperly operated flare



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Enhanced LDAR Programs (ELP) EPA Defines

- "A set of requirements that are designed to systematically raise the quality and effectiveness"
- <u>14 Elements</u> Applied to All Industries and Sites with very few differences

ELP 14 Elements

- A. Applicability
- B. Facility-Wide Document
- C. Montoring
- Frequency
- **D.** LDAR Action Levels
- E. Repairs
- F. Delay of Repair

- G. Low Emission Technology
- H. Management of Change

. Training

- J. QA/QC
- K. LDAR Audits
- -. Complicance Certification
- M. Recordkeeping
- N. Reporting





EPA Low-E Valve Definition

Valves including packing or sealing component

that a

- "manufacturer has issued a warranty, certification or equivalent documentation that a valve will not emit fugitives at greater than 100 ppmv
- if it does so emit at any time in the first 5 years,
 the manufacturer will replace the valve."

EPA has estimated 60% of fugitive emissions are from valves

EPA recognizes Low-E Valves have been used by some Industry sites for over 15 years

Sources of Fugitive Emissions by Equipment Type





Packing and Valve Manufacturers Low-E Valve Requirements

- **Product Testing Qualification**
- Manufacturing Changes
- Implementation of Product and Manufacturing Technology

Manufacturers Not Committed to Low-E Valves Reduce Availability to Fewer Manfacturers

Manufacturers May or May Not Choose to Meet Low-E Valve Requirements

Many valves claimed to be "Low Emission" do not meet current EPA requirements for "Low Emissions"



API 624 – Type Testing of Rising Stem Valves Equipped with Graphite Packing for Fugitive Emissions (2014-1st Edition)

ISO 15848-1 – Industrial valves – Measurement, test and qualification procedures for fugitive emissions (2006-1st Edition)

Valve Cycles

- API-310
- ISO-500 (C01)
 <u>205 Proposed</u>

Retorque

- API-NO
- ISO-YES

Packing

• API 622 – Type Testing of Process Valve Packing for Fugitive Emissions (2011-2nd Edition)

Test Gas

- API-Methane
- ISO-Helium
 <u>Methane Proposed</u>

Leak Method

- API-Sniffing (US EPA Recognizes Method 21)
- ISO-vacuuum or flushing
 <u>Sniffing Proposed (Methane)</u>

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US Industry and Manufacturers Jointly Developing New API Standards

API 624 Testing - Unique Challenges for Valve Manufacturers and 3rd Party Testing

Sizes

3/4in(DN20) 1-1/2in(DN40) 4in(DN100) 12in (DN300) 20in (DN500)

Pressure Classes

150# (PN20) 600# (PN100) 800#(PN135) 1500# (PN250)

API 600 and API 623

- Gates = 8
- Globes = 6

- Gates = 4
- Globes = 4

Fugitive Emissions Cycling <u>API 624</u>

- 3 Thermal Cycles
- Constant pressure
- VOC Temperature

ISO 15848-1

- 2 Thermal Cycles
- Elevated pressure
- Elevated temperature

API 622

- Packing Tests Required
 - 1. Fugitive Emissions
 - Test Fixture (horizontal)
 - 1510 Total Cycles
 - 5 Thermal Cycles
 - No Maximum Leakage (1 time retorque to manufacturers specification or when 500 ppmv exceeeded)
 - 2. Corrosion
 - 3. Weight Loss
- 3rd Edition Under Development
 - 100 ppmv maximum
 - No retorque

US Industry and Manufacturers Jointly Developing New API Standards

Fig 2. Comparison of middle ring's structure

US Industry and Manufacturers Jointly Developing New API Standards

API 600 – Steel Gate Valves Flanged and Butt-welding Ends, Bolted Bonnets (2015-13th Edition)

API 602 – Steel Gate, Globe and Check Valves for Sizes NPS 4 (DN100) and Smaller (2015-10th Edition)

API 623 – Steel Globe Valves-Flanged and Butt-welding Ends, Bolted Bonnets (2013-1st Edition)

- API 624 for Valves <u>REQUIRES</u> API 622 for Packing (API 622 leakage and retorque different than API 624)
 - API 600 for Larger Gate Valves Required
 - API 602 for Gate and Globe Valves (Pending Publication)

• API 623 for Globe Valves (next Edition)

NEW API 641 – Type Testing of Quarter-turn Valves for Fugitive Emissions (20XX-1st Edition)

- Graphitic Packing
- Under Consideration
 - PTFE
 - Elastomers
 - Lower Temperatures
 - Higher Cycles
 - <u>Currently no packing tests for materials</u>
 <u>other than graphite</u>

- 1) API 600 Steel Gate Valves Flanged and Butt-welding Ends, Bolted Bonnets (2015-13th Edition)
- 2) API 602 Steel Gate, Globe and Check Valves for Sizes NPS 4 (DN100) and Smaller (2015-10th Edition)
- **3)** API 622 Type Testing of Process Valve Packing for Fugitive Emissions (2011-2° Edition)
- 4) API 624 Type Testing of Rising Stem Valves Equipped with Graphite Packing for Fugitive Emissions (2014-1st Edition)
- 5) NEW API 641 Type Testing of Quarterturn Valves for Fugitive Emissions (20XX-1st Echica Content of Conte

<u>API Standards – 5 New or</u> <u>Revised</u>

- Only recent awareness for some Industries and Manufacturers
- Limited Testing Facilities
- 3rd Party Testing Preferred

Subcommittee on Piping & Valves

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Low-E Valves Distribution and Other Inventory Challenges

Low-E Valve Stocking Inventory

• API 624 and API 622 Certifications REQUIRED

Inventory Challenges for Non-low Emissions Valves

- Non-low Emissions Existing inventory
- Non-Low Emissions Valves conversion to Low-E Valves (Low-E modifications to meet industry requirements and end user AML's)

Industry Inventory Conversion to Low-E Valves

- Subcontract Conversion to Low-E Valves
- Multiple Locations Conversion to Low-E Valves

MRC Global

Bonney Forge Low-E Valve Development

Bonney Forge API 622 Testing for Packing and Valves

- Testing began more than 5 years ago for <u>EPA future</u> requirements
- <u>Valves API 622 tested</u> 1510 cycles, and 5 thermal cycles
- No packing retorques
- Below 50 ppmv leakage for packing and all valves

Bonney Forge Global Low-E Valves for API and ISO

- Eco Seal® Packing and Valves
 - Engineered packing to fit tighter tolerances and critical design geometry for all valves
 - Certified to most recent standards
 - Bonney Forge Stocks Only Low-E Valves

BONNEY FORGE READY TO LEAD THE WAY WITH <u>GLOBAL</u> LOW-E VALVES

<u>100% of Bonney Forge Low-E Valves</u> Manufactured and Tested with Eco-Seal® Packing Only

- 2012 API 600 & 623
- 2013 API 602

ISO 15848-1

• Tests below Class BH leakage limit

API, ISO and Other Global Standards

 Bonney Forge does continuous FUGITIVE EMISSIONS testing to new standards and changes to existing standards

BONNEY FORGE WORLD-CLASS LEADER LOW EMISSIONS TECHNOLOGY

China, Italy, US Manufacturing Locations

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