



U.S. Department  
of Transportation

**Pipeline and Hazardous  
Materials Safety  
Administration**

1200 New Jersey Avenue, SE  
Washington, DC 20590

May 2, 2024

Anthony Roston  
United Testing Services  
Chabot Collision Building  
20736 Lake Chabot Rd.  
Castro Valley CA 94546-5406

Reference No. 23-0041

Dear Mr. Roston:

This letter is in response to your April 20, 2023, email requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to Department of Transportation (DOT) specification 39 (DOT 39) non-reusable (non-refillable) cylinders. You ask for additional clarification of the requirements in § 178.65 which state that “[b]razed seams must be assembled with proper fit to ensure complete penetration of the brazing material throughout the brazed joint.” Specifically, you ask whether radiographic and photographic images that you provided of a DOT 39 cylinder were representative of a weld with “complete penetration” and whether a cylinder weld with voids could still be in compliance with § 178.65.

As stated in an earlier letter of interpretation we issued and that you cited (Reference No. 21-0097), PHMSA cannot determine whether a violation of § 178.65 exists based solely on photographic evidence. While the criteria provided in the HMR are not specific to the presence of voids in welds, § 178.65(c)(2) specifies that for seams:

- Brazing is not authorized on aluminum cylinders;
- Brazing material must have a melting point of not lower than 1,000 °F;
- Brazed seams must be assembled with proper fit to ensure complete penetration of the brazing material throughout the brazed joint;
- Minimum width of brazed joints must be at least four (4) times the thickness of the shell wall; and
- Brazed seams must have a design strength equal to or greater than 1.5 times the minimum strength of the shell wall.

I hope this information is helpful. Please contact us if we can be of further assistance.

Sincerely,

Dirk Der Kinderen  
Chief, Standards Development Branch  
Standards and Rulemaking Division

**From:** [Foster, Glenn \(PHMSA\)](#)  
**To:** [Dodd, Alice \(PHMSA\)](#)  
**Subject:** FW: 19-F-00183 (CPSC), RP120140 (D.O.T.), 21-0097 (D.O.T.), 20180519-A9E35-2147387862 (CPSC) - Request for Letter of Interpretation (D.O.T.), and Recall Action (C.P.S.C. and D.O.T. - Handheld torch products)  
**Date:** Friday, April 21, 2023 11:53:54 AM  
**Attachments:** [230420 UTS reporting braze defect voids NRT Cylinders-CPSC DOT.pdf](#)

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Alice,

Please have the attached checked in and assigned to a Specialist as a new request for a LOI.

Thanks,  
Glenn

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**From:** Anthony Roston <unitedtestingservicesllc@gmail.com>  
**Sent:** Thursday, April 20, 2023 3:03 PM  
**To:** Egray@cpsc.gov; Jsmith@cpsc.gov; MSchoem@cpsc.gov; section15@cpsc.gov; jenny.mclaughlin@hc-sc.gc.ca; Ttopka@cpsc.gov; dlarue@cpsc.gov; asuchy@cpsc.gov; Ksuper@cpsc.gov  
**Cc:** Foster, Glenn (PHMSA) <Glenn.Foster@dot.gov>; Hillman, Kenetha CTR (PHMSA) <kenetha.hillman.CTR@dot.gov>; Pollack, Arthur (PHMSA) <arthur.pollack@dot.gov>; andrew@eastbaylaw.com  
**Subject:** 19-F-00183 (CPSC), RP120140 (D.O.T.), 21-0097 (D.O.T.), 20180519-A9E35-2147387862 (CPSC) - Request for Letter of Interpretation (D.O.T.), and Recall Action (C.P.S.C. and D.O.T. - Handheld torch products

**CAUTION:** This email originated from outside of the Department of Transportation (DOT). Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear Mr. Gray, Mr. Foster, and  
Notice Recipients:

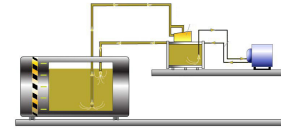
Please see attached letter request sent to CPSC and to the D.O.T.

Sincerely,

Anthony Roston  
United Testing Services  
Castro Valley, CA  
925-872-1850



**United Testing Services LLC  
Chabot Collision Building  
20736 Lake Chabot Rd.  
Castro Valley CA 94546-5406  
Tel. 916-416-5904  
unitedtestingservicesllc@gmail.com**



Mr. Eric T. Gray, Compliance  
Officer, CPSC

Reference:

1. CPSC Report No.  
20180519-A9E35-2147387862

Mr. T. Glenn Foster, Regulatory  
Review, U.S. DOT, Pipeline and  
Hazardous Materials

2. CPSC Recall file RP120140

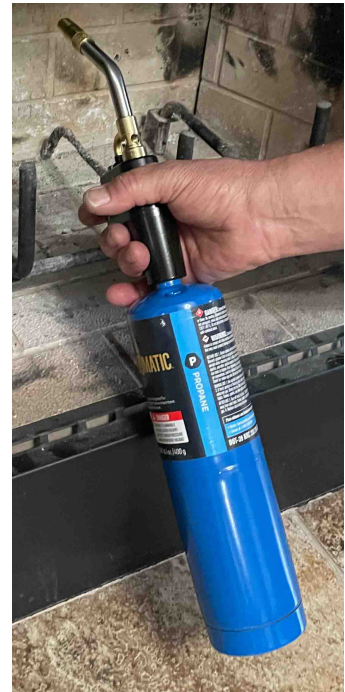
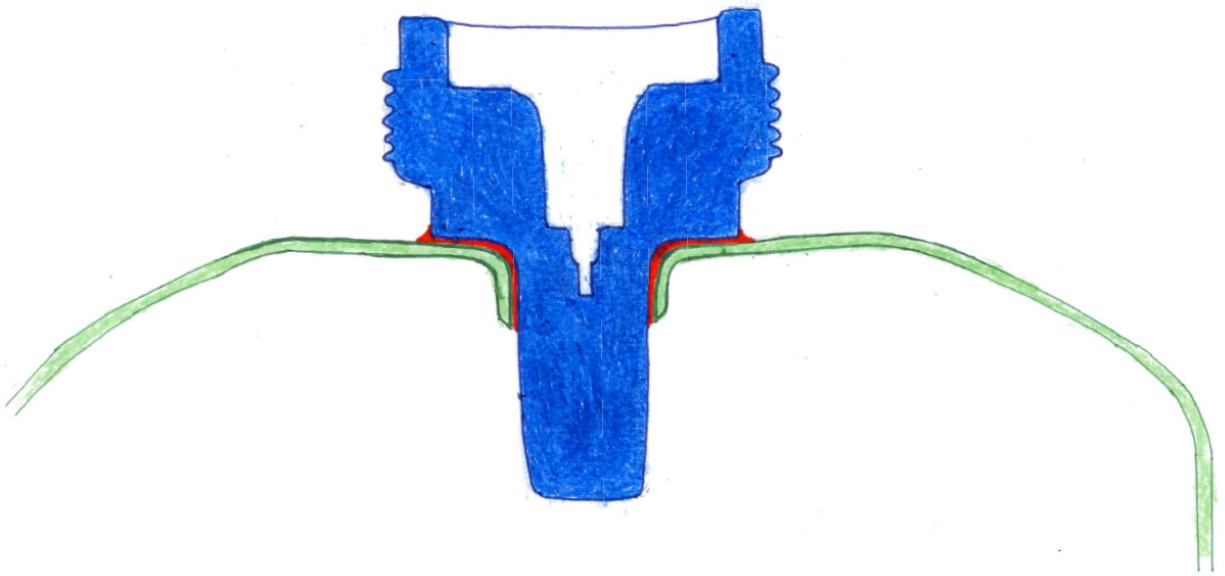
3. FOIA request 19-F-00183

April 20, 2023

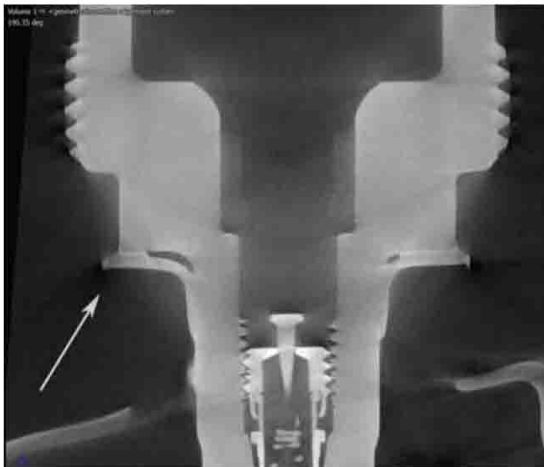
Dear Mr. Gray and/or CPSC Person of Interest,  
Dear Mr. Foster and/or D.O.T. Person of Interest:

We are submitting a reporting of a defect with the BernzOmatic and Worthington brand handheld torches, which are sometimes sold under several other names (i.e. Sears, Lenox, etc.). The manufacturer is Worthington Cylinder Corporation in Ohio. Their counsel, last in touch with Mr. Gray in re RP120140, is Mr. Richard Ergo, of Walnut Creek, California. This reporting may extend to the recall, RP120140. Mr. Foster, of the D.O.T. Pipeline and Hazardous Materials division, issued a letter of interpretation regarding the defect on 6/23/22. We will therefore begin by asking Mr. Foster to issue a further letter of interpretation to resolve a difference of terminology regarding the words “complete penetration” as they related to the defect described below. We will also ask both the D.O.T. and the C.P.S.C. to initiate a recall of the product due to the defects stated.

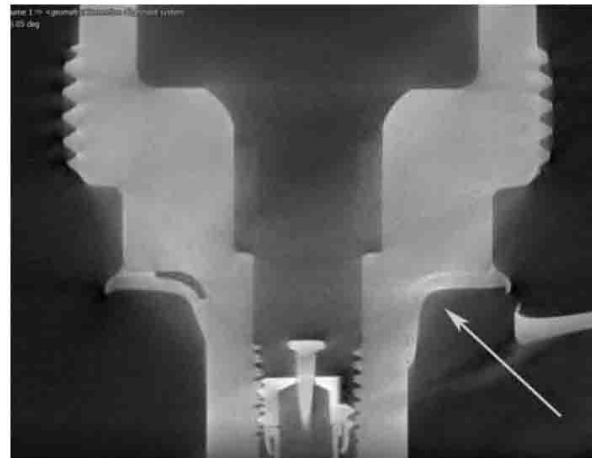
The subject fuel cylinders have failed many times at the neck area, also called the “main valve housing,” shown in the photo provided by Worthington’s engineer, Steve Gentry several years ago:



Worthington Cylinder Corporation took x-ray and scan images of the two failed cylinders shown in the photo above in 2018. Both cylinders contained the large voids and gaps shown on Worthington's images:



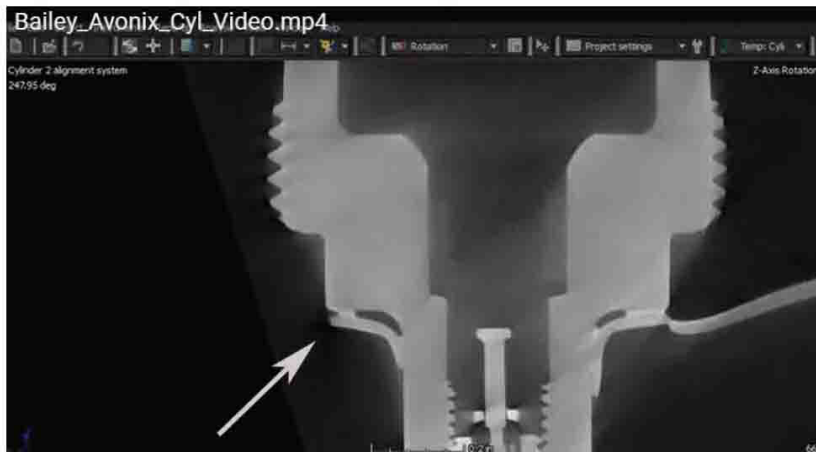
JPV-1



JPV-2

- Peralta cylinder, large voids

\*voids do not go 360° around as stated by Dr. Pfaendtner.



KBV-1

(braz compound is minimal, void quite large)



KBV-2

\*voids do not go 360° around as stated by Dr. Pfaendtner

Worthington's engineer then obtained one random cylinder from Lowes Home Improvement and took images of the brazing compound. Those images also showed the presence of large voids as shown here:

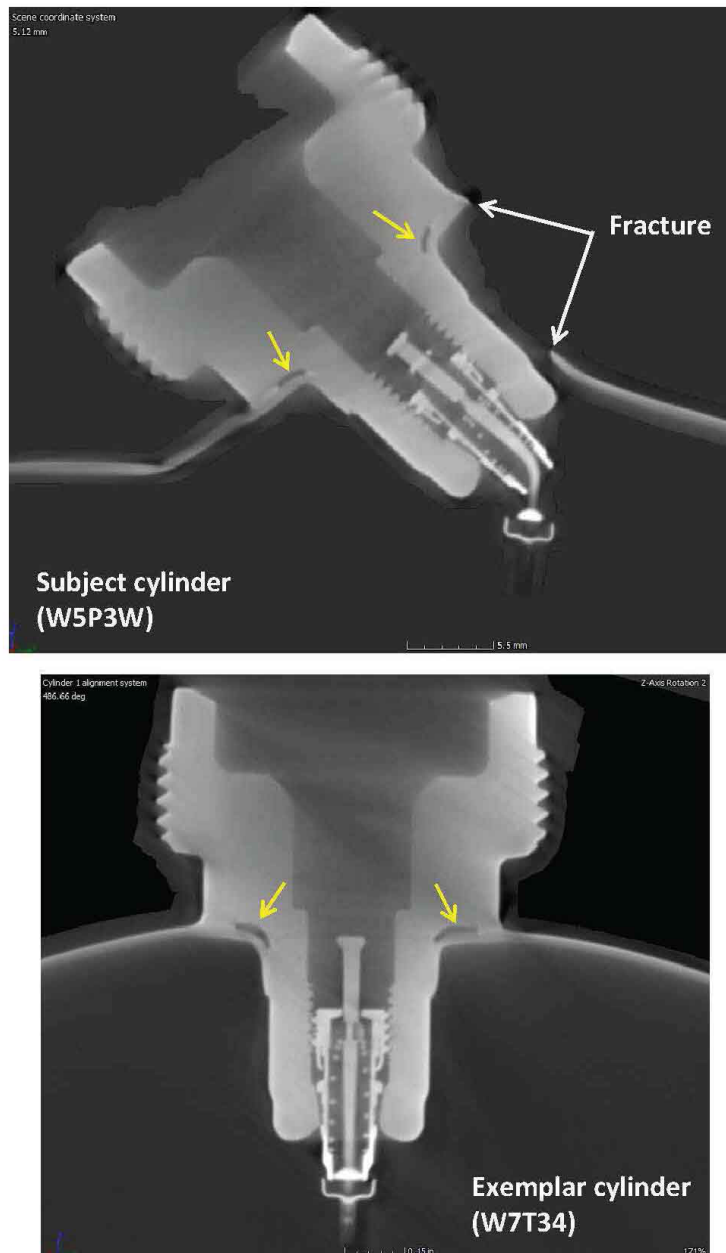


Figure 17. Computed Tomography (CT) X-ray images of dome area of subject (top image) and exemplar (bottom image) propane cylinders. Yellow arrows indicate voids in braze.

We have also personally spoken with five of the victims of cylinders which failed at the neck as shown in the photo above: (1) Kurtis M. Bailey, *Bailey v. Worthington*, 1:17-cv-7548-PGR (Northern District of Illinois); (2) Jason Peralta, *Peralta v. Bernzomatic/Worthington*, 2:17-cv-3195-JJT (Arizona); (3) Andrew Shalaby, *Shalaby v. Bernzomatic*, 3:11-cv-00068-AJB (S. Dist. CA); (4) Murray Shadbolt (Canada); and Jacob Avery (Massachusetts). The injury victims all reported failure of the cylinder at the neck without application of any unusual or unforeseeable forces. The manufacturer filed expert witness reports that in essence stated that the injury victims were lying about the manner with which they used the torches, and that the victims had to have exerted a very strong amount of force. Their expert performed duplication tests to try to show the types of forces they had to have subjected the cylinders to, and took videos and photographs, such as shown here:



(Photos courtesy of Worthington and its experts.)

Worthington's engineer stated that he tested six non-defective cylinders. He struck five of them on a solid sharp edge of a workbench as hard as he could, but could not get them to fail. He then created a raised edge as shown above, and struck it as hard as he could to cause one cylinder, the sixth tested, to fail as shown. He also stated that the torches in the two cases he was assigned to, Bailey and Peralta, could not have possibly failed under the use described by Mr. Bailey and Peralta, because such a failure would be impossible if they were not defective. Mr. Bailey and Peralta have given sworn statements that the cylinders did indeed fail under normal use and without application of any such forces. Mr. Shalaby also stated that he was just using his torch in a normal manner, without application of any such forces, and it failed at the neck as well. All of the victims suffered severe permanent burn injuries. Other victims, whose families filed cases in different states, have died from their injuries.

Mr. Foster (DOT), your letter of interpretation responded to the above-shown photos of the voids in the brazing compound. You correctly disclosed the following:

“You ask whether the photos and videos linked in your letter illustrate a brazed seam of a DOT 39 cylinder that does not meet the requirements set forth in § 178.65(c)(2)(iii). Under § 178.65(c)(2)(iii), "Brazed seams must be assembled with proper fit to ensure complete penetration of the brazing material throughout the brazed joint."

However, Worthington's Attorney Mr. Ergo, who corresponded with Mr. Gray regarding CPSC recall file RP120140, provided Worthington's interpretation as follows:

“‘Complete penetration’ does not mean the absence of voids. Rather, it means that the brazing material (copper metal in this case), when liquefied in the brazing furnace, flows throughout the entire joint”.

This definition appears to be inconsistent with that of the D.O.T. as well as inconsistent with the interpretation of educational institutions, such as these:

“Effects of Capillary Attraction and Wetting on Brazing Capillary attraction makes leak-tight joints a simple proposition for brazing. In a properly designed joint, the molten filler metal is normally drawn completely through the joint area **without any voids or gaps**, and brazed joints remain liquid- and gas-tight under heavy pressures, even when the



joint is subjected to shock or vibrational types of loading.”<sup>1</sup>

Voids or porosity - an incomplete flow of brazing filler metal which can decrease joint strength and allow leakage-often caused by improper cleaning, incorrect joint clearance, insufficient filler metal, entrapped gas or thermal expansion.<sup>2</sup>

The latter interpretations appear to be the same as provided by Metallurgist Dr. Robert Anderson in the Shalaby matter on June 25, 2008, which is attached, and states:

“The brazing materials have large voids in the bulk and smaller voids in the interface between the cylinder walls and the center valve housing as shown in Microphotographs 6, 7, and 8. The brazing on the outer surface of the cylinder is undercut in all three cylinders rather than forming a meniscus. The undercutting is a sign of lack of wetting and penetration of the brazing material with the cylinder and valve[...] The Bernzomatic one pound MAPP gas cylinder is manufactured per Federal specification published in 49 CFR 178.65 (D.O.T. 39). The specification for non-reusable (non- refillable) cylinders states "brazed seams must be assembled with proper fit to ensure complete penetration of the brazing material throughout the brazed joint." The brazed joints shown in microphotographs 6, 7, and 8 lack complete penetration. For these three cylinders that were examined to be offered on the market clearly establishes the failure of Bernzomatic inspection and quality control procedures. The MAPP gas torch and cylinder is unsafe and unreasonably dangerous as designed and manufactured.”

In addition, we discovered a defect of over-pressurization of the cylinders from Worthington’s Engineer’s documents produced. One specification document is dated “5-19-06” and identified as “WCW000376.” The second specification document is dated 5/14/13 and was originally produced with the identification number “WCW000083,” but also has identification number “WCW000374”. A version of the same document, with a revision history showing the date “3-20-18,” is identified as “WCW000377. The specification documents specify the working pressure, test pressure, pressure relief valve discharge

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<sup>1</sup>Source 7/16/21:

[https://www.asminternational.org/documents/10192/1849770/06955G\\_Chapter\\_2.pdf](https://www.asminternational.org/documents/10192/1849770/06955G_Chapter_2.pdf)

<sup>2</sup>Source:

<https://blog.lucasmilhaupt.com/en-us/about/blog/inspecting-brazed-joints>

pressure, relief valve reseal pressure, and cylinder burst pressure. The specification documents reflect facial defects in the specifications themselves, to wit:

	WCW000376 5/19/06	WCW000374 5/14/13	WCW000377 5/14/13
Minimum Burst Pressure	260 PSIG (7-14-08 was 900 PSIG)	750 PSIG	750 PSIG
Working Pressure	260 PSIG	260 PSIG	260 PSIG
Test Pressure	325 PSIG	325 PSIG	325 PSIG
Relief Valve Start To Discharge	260 PSIG (7-14-08 was 380-480 PSIG)	360-520 PSIG	360-520 PSIG
Relief Valve Reseal	260 PSIG	260 PSIG	260 PSIG

The specification documents reflect that the minimum cylinder burst pressure specification was as low as 260 PSIG on one document, while that figure was lower than the “test” pressure, facially evidencing a defect. (See WCW000376.) The same document shows the test pressure at 325 PSIG, which is higher than the “minimum burst pressure.” On WCW000474, the pressure relief valve specification was 360-520 PSIG, as compared to the much lower 260 PSIG shown on WCW000376.

Worthington’s engineer, Dr. Thomas Eagar, declared that the relief valve specification was 360-480 PSI, which is not shown on any of Worthington’s specification documents.

The defective specifications are on the specification sheets themselves. On a report prepared by Worthington’s Dr. Eagar, he reveals the following:

There have been over-pressurization failures in the past but not with such violent energy releases. In each prior over-pressurization, the PRV released as intended, performing its intended safety function.

He was referring to a cylinder that was over-pressurized, and failed with the neck (main valve housing) having ripped a full 360 degrees around, causing shrapnel to lodge in the neck of one Mrs. Astrid Marmont, killing her.

Based on the above information, we ask that Mr. Foster provide a new letter of interpretation, advising whether Worthington’s definition of complete wetting and penetration quoted above is the correct interpretation, or whether Dr. Anderson’s interpretation quoted above, which appears consistent with ASM International’s interpretation also quoted above, is the correct interpretation. Specifically, do voids in the brazing compound of the subject cylinder, as shown in Worthington’s x-ray and scan photos



above, evidence a failure of compliance with the D.O.T.'s requirement for "complete wetting and penetration"?

Mr. Gray, or otherwise, CPSC, and also Mr. Foster, or otherwise the D.O.T., we also request that CPSC and D.O.T. require a full recall of the subject cylinders due to the voids and failures noted. To aid in this process, we have now collected several of the defective and failed cylinders, including the ones involved in Bailey, Peralta, and Shadbolt (Canada). The remaining defective and failed cylinders are believed to be in possession of Worthington's counsel, Mr. Ergo, and there are quite a few.

Sincerely,

A handwritten signature in blue ink, appearing to be "AR" or similar initials, followed by a long horizontal flourish.

Anthony J. Roston & Manuel Marieiro,  
United Testing Services, LLC

**R N A Consulting, Incorporated**  
*Specializing in forensic materials engineering and sciences*

**Robert N. Anderson, Ph.d., P.E., President**

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June 25, 2008

Mark D. Epstein  
Alborg, Veiluva & Epstein LLP  
200 Pringle Avenue, Suite 410  
Walnut Creek, CA 94596-7380

Re: Shalaby v. Irwin, et al.

Dear Mr. Epstein:

At your request, I have examined the 4/21/06 incident where Mr. Andrew Shalaby was injured while using a 16 oz cylinder Bernzomatic MAPP gas torch. MAPP gas is a trademark of the Dow Chemical Co. and is composed of extremely flammable methylacetylene-propadiene-propane.

It is my understanding that Mr. Shalaby was in the process of igniting logs in a fire pit, using a TS4000 torch head and Bernzomatic MG9 MAPP gas cylinder when the cylinder vented and he was burned. In the incident, the center valve housing, attached to the canister by brazing material, ruptured.

**Materials Reviewed:**

I have reviewed the following documents:

1. Deposition of **Michael Ridley**, Senior engineering manager, Irwin Industrial Tool Co., taken 11/13/07.
2. Deposition of **Steven T. Gentry**, Quality Control Department Worthington Cylinder Corp., 11/14/07.
3. Deposition of **Andrew W. Shalaby** volume I and II, Plaintiff, 10/24/07 and 10/25/07.
4. Deposition of **Warren L. Ratliff, Jr.**, Park ranger supervisor, Campland, 4/17/07.
5. Deposition of **Randy T. Stephens**, Ranger at Campland, 4/17/07.
6. Deposition of **Joe Russo**, Paramedic, 4/18/07.
7. Miscellaneous manufacturing drawings of torch parts.
8. Health & Safety Laboratory report 2006/121.
9. Bernzomatic instruction manuals 96001, 97090
10. Bernzomatic catalog.
11. Investigative Report with reference to interview of Anne Carrol and David Borger by Howard Felder 10/6/07.
12. Consumer Product Safety Commission Release # 78-088.
13. Transcribed statement of Andrew Shalaby by Joe Tancredy, 6/1/06
14. Material Safety Data Sheet for MAPP Gas.
15. Supplemental Response to Request for Production of Documents (Set No. One).
16. Worthington Industries Expert Witness Disclosures.

17. Third-Party Defendant/Cross Claimant Western Industries, List of Expert Witnesses.
18. Disclosure of Experts by Defendants, Bernzomatic.
19. Protective Order.
20. Defendants' Initial Disclosures.
21. Drawing 304432.
22. MAPP gas cylinder specifications.

### Analysis:

The failure of the Bernzomatic MAPP gas torch Mr. Shalaby was using appears to be at the collar or threaded area between the center valve housing and the cylinder. The center valve housing is fastened to the cylinder by a copper-nickel brazing material. The Rangers in the park that examined the gas torch confirm that the failure was in that location.

- Park Ranger Supervisor Warren Ratliff, in his deposition, comments were that there "appeared to be a crack in the cylinder at the bottom thread level of the cylinder" page 25, lines 21-25; page 26, lines 24-25.
- Ranger Randy Stephens comments on the failure in his deposition on page 42, lines 15-25; page 43, lines 1-11; page 73, lines 9-25; page 74 lines 1-15.
- Also, the recollection of Andrew Shalaby in his transcribed statement to Joe Tancredy on 6/1/06.

Mr. Shalaby was using the torch to ignite firewood in a fire pit and his torch would have been partially inverted in that situation. Health & Safety Laboratory report 2006/121 (report included in test results CD) determined that the torch orientation was important and confirmed that when the cylinder was inverted, explosion could occur. The directions do indicate "Use upright to prevent flare-ups or flashes" caused by the liquid entering the torch. However, this orientation is impossible in some situations.

CPSC Release # 78-088 issued a notice of a recall for fuel cylinders from another manufacture (Cleanweld Products) that separated "where the threaded connector meets the cylinder". A flaw in this area is very serious.

A review of other MAPP gas torch failures involving lawsuits filed since January 2002 and supplied by the Defendant in their Supplemental response to request for production of documents (Set One) had listed 7 lawsuits identified below.

1. Thomas Segrest, Jr. v. Bernzomatic. (Date of injury 2/9/04)
2. Richard Gleen v. Newell Operating Co. (Date of injury 1/3/06)
3. Andrew Gelzer v. Thermadyne (Date of injury 2/13/04)
4. Melvin Wilfredo Bonilla Carranza v. Bernzomatic. (Date of injury 6/13/05)
5. Ross Pelz v. Worthington Industries. (Date of injury 5/29/05)
6. Mark Loewes v. Worthington Industries. (Date of injury 3/27/05)
7. Timothy Welch v. Newell Rubbermaid (Date of injury 7/3/06)

The Glenn v. Newall is a Ventura California case in which a Bernzomatic cylinder failed at the braze material (**Photographs 1, 2**).

In addition, I have reviewed photographs for a Minnesota case called Venderlinde v. Ace Hardware Corp., where a "TurboTorch" failed in the braze material between the center

valve housing and the cylinder. There are two Lenox cylinders (John Barrett v. Lenox and Lemaralejo) that also failed in the same location.

### Tests Conducted:

1. Metallography of the brazing material in MAPP gas cylinders.
2. Microhardness of the brazing material in MAPP gas cylinders.
3. Energy Dispersive Spectrum (EDS) of MAPP brazing material.
4. Metallography of corrosion test of the MAPP brazing material.
5. Metallography of brazing material in MAPP PRO gas cylinder.
6. Microhardness of the brazing material in MAPP PRO gas cylinders.
7. EDS of brazing material in MAPP PRO gas cylinders.

Test data are contained in a compact disc (CD) included with this report.

The braze material is a copper nickel alloy. The composition was determined to be approximately 61 % (atomic) Cu and 39 % Ni by Energy Dispersive X ray. This is 63% Cu by weight and the specifications on Drawing 32600-23 call for a maximum of 60% by weight Cu. It is possible that the brazing material is off specifications.

Steven Gentry in his deposition (page 89, line 7) states that the brazing temperature is between 2000 and 2100 degrees Fahrenheit, which is 1093 – 1149 degrees centigrade. According to the Cu-Ni phase diagram (See Figure 1) from the reference "Hansen, Constitution of Binary Alloys", that temperature is too low to melt the brazing alloy.

It should be noted that the brazing material used in the Bernzomatic MAPP PRO cylinders has been changed to all copper without the addition of nickel. Metallography of the MAPP PRO brazing material is shown on the CD.

### Conclusions/Findings:

Based on the facts of failure in the brazed area, I have examined three exemplar MAPP gas cylinders, (W10G57E, W11G152W and W8G230E), with respect to the Cu-Ni braze between the center valve housing and the cylinder. Microhardness testing of the brazing metal gave values of 23 HRC for W10G57E; 33 HRC for W11G152W, and 97 HRB for W8G230E.

The cylinders have been sectioned in half and four sections have been cut from each cylinder to show a portion of the neck piece and cylinder wall and the brazing material between. These sections have been mounted in plastic and polished and photographically documented. Representative examples of the microphotographs from each cylinder are shown in **Photographs 3, 4, and 5**. **The brazing materials have large voids in the bulk and smaller voids in the interface between the cylinder walls and the center valve housing as shown in Microphotographs 6, 7, and 8.** The brazing on the outer surface of the cylinder is undercut in all three cylinders rather than forming a meniscus. The undercutting is a sign of **lack of wetting and penetration of the brazing material with the cylinder and valve.** A good meniscus shows that wetting has occurred. **The brazing defects shown in photographs 3-8 reduce the strength of the joint and make it more likely that the valve will partially separate from the cylinder and release gas when the torch is used as intended.**

The outside surface of the brazing material that is undercut represents a lack of wetting and penetration of the brazing material with the cylinder and valve housing. This flaw is sufficient to reject the cylinder. This flaw should have been picked up by the manufacturer with a simple visual inspection of the cylinders.

The Bernzomatic one pound MAPP gas cylinder is manufactured per Federal specification published in 49 CFR 178.65 (D.O.T. 39). The specification for non-reusable (non-refillable) cylinders states "brazed seams must be assembled with proper fit to ensure complete penetration of the brazing material throughout the brazed joint." The brazed joints shown in microphotographs 6, 7, and 8 lack complete penetration.

Corrosion tests show that the brazing material is strongly cathodic to the cylinder and valve and will cause the steel to corrode in a suitable moist atmosphere. The interior walls, of the sectioned cylinders, also showed signs of corrosion. See Photograph 9, Interior View of Cylinder W10G57E Showing Corrosion.

In my opinion, the braze material between the center valve housing and the cylinder is the weak element in the assembly, and subject to failure when the torch is attached to the cylinder. The brazing material has voids and lacks sufficient fusion to the cylinder wall and valve housing to resist stresses placed on it when used in a normal manner. This problem with the brazing material is due to a combination of poor cleaning of the brazing area, contamination of the brazing material and improper process parameters such as furnace temperature and time. For these three cylinders that were examined to be offered on the market clearly establishes the failure of Bernzomatic inspection and quality control procedures.

The MAPP gas torch and cylinder is unsafe and unreasonably dangerous as designed and manufactured.

Please call me if you have any questions.

Sincerely,

  
Robert N. Anderson, Ph.D., P.E.



**Photo 3: W10G57E. @ 13X. Valve housing on the top and cylinder on the bottom with brazing material inbetween.**

