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SJC-12258

COMMONWEALTH vs. MARC ALDANA.

Worcester. March 7, 2017. - September 19, 2017.

Present: Gants, C.J., Lenk, Hines, Gaziano, Lowy, & Budd, JJ.<sup>1</sup>

Destructive or Incendiary Device or Substance.

Indictments found and returned in the Superior Court Department on December 20, 2013.

A pretrial motion to suppress evidence was heard by Daniel M. Wrenn, J., and the cases were heard by Richard T. Tucker, J.

The Supreme Judicial Court on its own initiative transferred the case from the Appeals Court.

Ethan C. Stiles for the defendant.  
Joseph A. Simmons, Assistant District Attorney, for the Commonwealth.

LENK, J. In the course of arresting the defendant at his apartment on a default warrant, Worcester police officers saw in his kitchen three bags containing unknown powders. One of the

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<sup>1</sup> Justice Hines participated in the deliberation on this case prior to her retirement.

bags was labeled "aluminum powder," another "red iron oxide," and one bag was not labeled. An unidentified red-brown powder was spilled on the counter and the kitchen window sill, and smudged on the wall around the window. Concerned about the appearance of the bags of powder, given the other circumstances in the apartment, one of the officers undertook an Internet search for information on the labeled substances. On the basis of information derived from that search, a detective requested assistance from the Federal Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), the State police, and the local fire department. Representatives of these agencies arrived, seized the bags of powder, and removed them from the apartment.

The defendant thereafter was indicted on two charges of possession of the ingredients to make an incendiary device or substance with the intent to do so, in violation of G. L. c. 266, § 102 (a), and a single charge of possession of an incendiary device or substance, in violation of G. L. c. 266, § 102 (c).

After a jury-waived trial in the Superior Court, the defendant was convicted of both charges under G. L. c. 266, § 102 (a), and acquitted of the charge under G. L. c. 266, § 102 (c).<sup>2</sup> In this appeal, the defendant argues that the

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<sup>2</sup> The defendant was not charged under G. L. c. 148, § 12,

ingredients seized and observations made by police during the search of his apartment should have been suppressed, and that the evidence at trial was in any event insufficient to support his convictions. In the alternative, the defendant contends that his convictions are duplicative and that one must be vacated.

To convict the defendant of a violation of G. L. c. 266, § 102 (a), the Commonwealth was required to prove beyond a reasonable doubt that the defendant had in his possession or control, without lawful authority to do so, a "substance . . . which, alone or in combination, could be used to make a destructive or incendiary device or substance" and that he intended to "make a destructive or incendiary device or substance." To prove that what the defendant intended to make was a violation of the statute, the Commonwealth was required to establish that the device or substance was "designed or adapted to cause physical harm to persons or property by means of fire, explosion, deflagration or detonation and consisting of [a] substance capable of being ignited, whether or not contrived to ignite or explode automatically." G. L. c. 266, § 101.

We conclude that the evidence introduced at trial was not sufficient to establish that the defendant was without lawful

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which is applicable to pyrotechnics, e.g., fireworks.

authority to possess the powders themselves or the incendiary substance, thermite, that the Commonwealth asserted he intended to make. Since the evidence at trial was insufficient to establish at least one critical element of the Commonwealth's case, the defendant's convictions cannot stand. Accordingly, the matter must be remanded to the Superior Court for entry of required findings of not guilty.

1. Background. After a hearing on the defendant's motion to suppress, a Superior Court judge denied the motion in a written decision containing comprehensive findings of fact. The defendant thereafter was tried, jury-waived, by a different Superior Court judge. All of the individuals who had testified at the hearing on the motion to suppress -- officers involved in the arrest and the building manager -- testified to essentially the same facts at trial. In addition, testimony was introduced from another member of the Worcester police department, members of the State police bomb squad, a chemist and a State police evidence technician, two Worcester fire department lieutenants, and a defense expert in chemistry. In announcing his verdicts, the trial judge issued limited oral findings of fact and a brief explanation of his reasoning. We recite the facts the trial judge could have found, reserving some facts for later discussion.

a. Evidence at trial. On October 15, 2013, officers of

the Worcester police departments went to the defendant's apartment to arrest him on a default warrant for a charge of disorderly conduct. Detective Sergeant Mark Richardson of the Worcester police department, and other Worcester police officers, entered the building and went to the door of the defendant's apartment. Richardson knocked on the door and announced the police presence several times without receiving a response. After the officers heard movement inside the apartment and the sounds of breaking glass, Richardson ordered one of them to force entry into the apartment.<sup>3</sup>

The defendant was arrested almost immediately upon the police entry. Through the kitchen doorway, officers could see an open kitchen cabinet and drawers standing open. The officers saw two foil bags of powder, and one unlabeled plastic bag containing a reddish-brown powder, on the counter and in the open kitchen cabinet. One foil bag was labeled "aluminum powder" and the other was labeled "red iron oxide." The officers did not recognize the names, and were not familiar with

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<sup>3</sup> In his motion to suppress, the defendant challenged, among other things, the propriety of the police entry, as he does before us. Because of the result we reach, we do not address the defendant's claims concerning the forced entry, or the other issues raised in his motion to suppress, including whether it was immediately apparent that the powders were dangerous, such that their seizure without a warrant fell within the plain view exception to the warrant requirement. We also do not reach the question whether the convictions were duplicative.

the appearance of the powders. One of the officers conducted an Internet search on his cellular telephone and reported to Richardson that, when mixed together, red iron oxide powder and aluminum powder produce thermite, a substance Richardson believed posed a significant public safety concern.

Thereafter, Richardson contacted ATF, the State police, and the Worcester fire department; at some point, he conducted a "sweep" of the apartment. State police Trooper Eric Gahagan, a bomb squad technician, arrived and examined the three bags of powders. Based on the appearance of the substance, he suspected that the unlabeled bag contained thermite. He took three samples from each of the three bags of powder and placed them in glass vials. Gahagan also performed a "sweep" of the apartment for signs of other possibly dangerous materials, and any means for lighting Thermite, and found none. He then took the samples back to the State police crime laboratory for testing. The remaining powders were placed in a plastic bin and transported to a Department of Public Works site to be destroyed by burning. Gahagan and an ATF agent mixed the three bags of powder together, at the site, and lit them remotely using a robot with an ignited road flare. The mixture burned for approximately five minutes before it consumed all of the aluminum and burned itself out.

A State police chemist testified regarding the steps he

took to determine whether the powders seized from the defendant's apartment were, indeed, thermite. First, he examined samples of each of the three powders under a microscope and confirmed that they were aluminum, red iron oxide, and a mixture of aluminum and red iron oxide. He then attempted to ignite the mixture with a Bunsen burner and was not able to do so; he did not attempt to ignite it with tools that burn at higher temperatures, such as a road flare or a magnesium strip.

The technical evidence concerning the properties of the various powders seized and their testing was essentially undisputed. Experts for both the Commonwealth and the defendant testified that thermite can be created by combining red iron oxide and aluminum powder, and that specific ratios are necessary for it to burn. Neither iron oxide nor aluminum powder is ignitable individually. The experts agreed that the only reason to combine red iron oxide and aluminum powder is to create a thermite mixture that can be ignited. When ignited, thermite burns at very high temperatures, at approximately 4,000 degrees Fahrenheit. Thermite is not explosive, will not ignite spontaneously, and, because of the high temperature at which it burns, cannot be ignited with an ordinary flame, such as a match or a Bunsen burner. To reach the high temperatures necessary to ignite thermite requires heat sources such as road flares,

firework sparklers, or magnesium strips.<sup>4</sup>

Thermite is used in military operations to dispose of old equipment or to disable it in the field so that it does not fall into enemy hands, and in civilian operations for metal salvage. Thermite also is used for cutting metal, including steel; for welding or filling in damaged portions of railroad tracks; for spot welding; for cutting through locks to open doors and safes; and, because it is not extinguished by water, in underwater welding.<sup>5</sup>

The sole evidence as to the licensing and permitting requirements applicable to thermite was introduced through Lieutenant Robert Mansfield of the Worcester fire department. Mansfield testified that he was responsible for fire hazard identification, inspection, and suppression in Worcester. Through his testimony, the Commonwealth introduced, and sought judicial notice of, §§ 9, 12, and 13 of G. L. c. 148, the State fire prevention act, and 527 Code Mass. Regs. §§ 13.00 (2012), a

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<sup>4</sup> Both Commonwealth and defense experts indicated that they believed thermite is relatively safe, is difficult to light, and is stable when unlit. The experts also stated that, in their many years of experience, investigations at the State police crime laboratory involving thermite are quite rare.

<sup>5</sup> Testimony at trial also indicated that red iron oxide (rust) and aluminum powder, individually, have ordinary civilian uses. One use for red iron oxide is as a pigment.



regulation in effect at the time of the defendant's arrest,<sup>6</sup> governing storage, use, and permitting of explosives, based on § 13 of the statute.<sup>7</sup> Mansfield explained that G. L. c. 148, § 9,<sup>8</sup> authorizes the fire department to require and issue permits to store and use certain explosive and inflammable substances and that G. L. c. 148, § 12,<sup>9</sup> requires licenses for the use and

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<sup>6</sup> Effective January 1, 2015, the version of 527 Code Mass. Regs. in effect at the time of the defendant's arrest was repealed. The current State comprehensive fire safety code is found in 527 Code Mass. Regs. §§ 1.00 (2016).

<sup>7</sup> Copies of the statutes and regulations Lieutenant Robert Mansfield discussed were presented to the judge and marked for identification. The judge did not state explicitly whether he took judicial notice of them. The parties dispute whether the judge also implicitly took judicial notice of 527 Code Mass. Regs. §§ 14.00, which then regulated the use and storage of certain inflammable solids, liquids, and gases. The transcript establishes that, at trial, the judge was not presented with 527 Code Mass. Regs. §§ 14.00 nor asked to take notice of it. See discussion, infra.

<sup>8</sup> "The board shall make rules and regulations for the keeping, storage, use, manufacture, sale, handling, transportation or other disposition of gunpowder, dynamite, crude petroleum or any of its products, or explosive or inflammable fluids or compounds, tablets, torpedoes or any explosives of a like nature, or any other explosives, fireworks, firecrackers, or any substance having such properties that it may spontaneously, or acting under the influence of any contiguous substance, or of any chemical or physical agency, ignite, or inflame or generate inflammable or explosive vapors or gases to a dangerous extent . . . ." G. L. c. 148, § 9.

<sup>9</sup> "No building shall be used for the manufacturing of fireworks or firecrackers without a license from the local licensing authority. No building or structure shall be used for the manufacturing or storage of explosive materials without a permit issued by the marshal." G. L. c. 148, § 12.

storage of, inter alia, fireworks and firecrackers. G. L. c. 148, § 13,<sup>10</sup> governs the storage, manufacture, and sale of explosives. The regulations concerning the manufacture, sale, and storage of explosives, implementing the provisions of G. L. c. 148, § 13, were then contained in 527 Code Mass. Regs. §§ 13.00.

Mansfield testified that the fire department's authority to regulate the storage of thermite was derived from 527 Code Mass. Regs. §§ 13.00.<sup>11</sup> Although that regulation did not mention thermite directly, he stated that thermite fell within its requirements because it explicitly incorporated 27 C.F.R. § 55.23, a Federal regulation setting forth a list of explosive materials.<sup>12</sup> To possess thermite in his apartment, the defendant

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<sup>10</sup> "No building or other structure shall, except as provided in [§ 14], be used for the keeping, storage, manufacture or sale of any of the articles named in [§ 9, defining blasting requirements], unless the local licensing authority shall have granted a license to use the land on which such building or other structure is or is to be situated for the aforementioned uses, after a public hearing . . . ." G. L. c. 148, § 13.

<sup>11</sup> Title 527 Code Mass. Regs. §§ 13.00 applied to the use and storage of "explosives" and "explosive materials," and also provided that "[t]he term also includes any material determined to be contained in the list of explosive materials provided for in 27 [C.F.R. §] 55.23." 527 Code Mass. Regs. § 13.03. "Explosive" was defined as "any chemical compound, mixture or device, the primary or common purpose of which is to function by explosion; i.e., with substantially instantaneous release of gas and heat." Id. See note 6, 8, supra.

<sup>12</sup> Contrary to this testimony, the then-applicable Federal

would have been required to have both a license from the State, after passing an explosives handling course, and a permit from the city of Worcester. Mansfield had examined the city's records and found no indication that the defendant had a permit to possess thermite; he stated also that he would never issue such a permit to anyone living in a multiunit residential building. He did not explain which of the statutory or regulatory definitions pertaining to "explosive," see G. L. c. 266, § 101 (defining "[e]xplosive" as "any element, compound or mixture that is manufactured, designed or used to produce an explosion"), were applicable to thermite.

Mansfield testified on cross-examination, without reference to any applicable statute or regulation, that possession of aluminum powder or red iron oxide would require a permit if it were above "a certain amount" because they are an "inhalation hazard."<sup>13</sup> No permit was required for possession of aluminum

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regulation listing specific explosives did not in fact contain any mention of thermite. See 27 C.F.R. § 55.23; 77 Fed. Reg. 58,410 (Sept. 20, 2012).

<sup>13</sup> Gahagan testified that red iron oxide and aluminum powder can be purchased legally, and stored lawfully in a residence. He also noted that the recipe for mixing thermite from the compounds is readily available on the Internet; he did not mention any requirement of a permit. The defense expert also testified that these components are legally available, can be ordered over the Internet, and are shipped by mail; he testified that the only restriction he was aware of was that certain companies would not ship them to a college dormitory address.

oxide. He also agreed that, under G. L. c. 148, § 13, certain quantities of explosives could be held without a permit or a license.

b. Trial proceedings. At the close of the Commonwealth's case, the judge denied the defendant's motion for required findings of not guilty. At the close of all the evidence, the judge found the defendant guilty of two counts of possession of the ingredients necessary to make a destructive or incendiary device or substance without lawful authority and with the intent to make such a device or substance, in violation of G. L.

c. 266, § 102 (a). The defendant was acquitted of possession of an incendiary device or substance in violation of G. L. c. 266, § 102 (c).

The judge found that the evidence proved beyond a reasonable doubt that "the defendant was in possession of aluminum powder and red iron oxide," and also in possession of "a mixture of these two substances." The judge explained that the defendant's combination of the two substances, and the absence of evidence that the defendant intended to use thermite for a legitimate purpose, demonstrated his intent to make thermite. The judge did not make findings or rulings or explain his reasoning as to whether the defendant had lawful authority to possess thermite or its components.

The judge also found that, while the evidence showed that

the mixture of the three bags combined by Gahagan and the ATF agent burned in a manner consistent with thermite, the evidence did not establish beyond a reasonable doubt that the mixture found in the defendant's kitchen would have been ignitable. He noted that, before investigators disposed of the seized powders, all three of them had been combined into a single mixture,<sup>14</sup> and that the combination burned as thermite would burn. The judge determined that, because the act of combining the three bags might itself have created the proper ratio, this did not establish that the seized mixed powder would have burned in the same manner, if at all. He noted in this respect that the bags of powders had not been weighed and the ratio of materials in the mixed bag had not been determined.<sup>15</sup>

The defendant appealed, and we transferred the matter from the Appeals Court on our own motion.

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<sup>14</sup> According to the ATF agent's report, which was introduced in evidence and about which Gahagan testified, "The red iron oxide and aluminum powder were spread in a line along the pavement with the suspected Thermite spread on top of the previous two chemicals."

<sup>15</sup> The judge explained his decision to acquit the defendant of the charged violation of G. L. c. 266, § 102 (c), as follows:

"My reasons include among other things the lack of the weighing or testing or burning of the mixture separately. I do not find beyond a reasonable doubt that the mixture would have burned, even with a flare igniter, if done without the presence of the remaining aluminum powder and red iron oxide."

2. Discussion. On appeal, the defendant argues that it was error to deny his motion to suppress, the evidence was insufficient to support his convictions, and the convictions are duplicative. We agree that the evidence was insufficient to support the convictions, and therefore do not address the defendant's other claims.

To convict a defendant of a violation of G. L. c. 266, § 102 (a), the Commonwealth must prove that the defendant (1) possessed or controlled, (2) without lawful authority, (3) a "substance . . . which, alone or in combination, could be used to make a destructive or incendiary device or substance," and (4) the defendant intended to "make a destructive or incendiary device or substance." To prove that the intended device or article fell within the meaning of a "destructive or incendiary device or substance," the Commonwealth was required to prove that the device or substance was "designed or adapted to cause physical harm to persons or property by means of fire, explosion, deflagration or detonation and consisting of [a] substance capable of being ignited, whether or not contrived to ignite or explode automatically." G. L. c. 266, § 101.

We conclude that the evidence was not sufficient to establish that the defendant lacked lawful authority to possess or control the powders seized, either individually or combined

as thermite.<sup>16</sup> The Commonwealth offered evidence that thermite, operating as it does through heat and not explosion, is an inflammable or incendiary substance, rather than an explosive substance. The Commonwealth did not offer evidence, through any witness or otherwise, that the possession of thermite, or, as here, of its component parts, is subject to regulation as an inflammable or incendiary substance. Mansfield's testimony did not bridge the evidentiary gap.<sup>17</sup> Because the trial evidence

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<sup>16</sup> As noted, the Commonwealth was also required to prove that the defendant intended to make a device or substance "designed or adapted to cause physical harm to persons or property by means of fire, explosion, deflagration or detonation" as defined in G. L. c. 266, § 101. The Commonwealth proceeded on the theory that the possession of thermite, standing alone, would suffice to establish such a device or substance. The issue not having been raised or briefed, we do not address the question of the sufficiency of the evidence in this regard. But see Commonwealth v. Loadholt, 456 Mass. 411, 431, vacated on other grounds, 562 U.S. 956 (2010), citing Commonwealth v. Mendes, 44 Mass. App. Ct. 903, 904 (1997) (distinguishing object "designed for" given use and object that "functions as" particular type of thing). "[A] device that explodes is not covered by [a similar Federal] statute merely because it explodes." United States v. Hammond, 371 F.3d 776, 780 (11th Cir. 2004) (cardboard tube filled with explosive powder was not designed as weapon and therefore was not destructive device under Federal statute; to establish that explosive is weapon, and therefore prohibited destructive devices requires "plus" factor). Compare United States v. York, 600 F.3d 347, 354-355 (5th Cir. 2010) (concluding that, under similar Federal statute, Molotov cocktail is designed as weapon and therefore is destructive device).

<sup>17</sup> Mansfield did not indicate which of the statutory or regulatory definitions pertaining to "explosives," see G. L. c. 266, § 101, he believed were applicable to thermite.

established that thermite is not an "explosive," but, rather, an "inflammable" or "incendiary" substance, the regulation as to explosives has no apparent application to thermite.

a. Sufficiency of the evidence of absence of lawful authority. In arguing that the evidence was not sufficient to support a conviction under G L. c. 266, § 102 (a), insofar as the Commonwealth failed to establish that he lacked lawful authority to possess thermite, the defendant does not challenge the testimony that he did not have a permit from the city of Worcester. Rather, he argues that the Commonwealth failed to establish that such a permit was necessary. He maintains that the fire safety regulations of which the judge was asked to take judicial notice, discussed at trial, concerned the storage of explosives, and therefore were not applicable to thermite, which is an inflammable.

The defendant argues further that, even had 527 Code Mass. Regs. §§ 14.00 (2012), the regulation then governing the storage of inflammables been introduced and considered, see note 7, supra, the evidence did not show that thermite was a "flammable solid,"<sup>18</sup> which requires permits for use and storage if the

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<sup>18</sup> General Laws c. 148, § 9, authorizes the creation of regulations governing "inflammable fluids or compounds." Title 527 Code Mass. Regs. § 14.03 then established differing storage and permitting requirements for flammable liquids, gases, and solids. As thermite is a powder, and a compound, any regulation



weight of the material is beyond the amount of a regulatory exemption.<sup>19</sup> Because the weights of the bags were not introduced at trial, there was no evidence that the powders in the defendant's possession exceeded the exempt amounts. Had the limited quantities noted on the labeled bags been an accurate representation of the weights, moreover, the amounts would have fallen within the amount allowed by the exemption.

"Because the absence of lawful authority or justification is an element of each of the crimes charged, the Commonwealth must prove beyond a reasonable doubt that [the] defendant acted without lawful authority or justification." Commonwealth v. Cabral, 443 Mass. 171, 179 (2005).

i. Applicable regulation. All of the regulations of which the judge was asked to take notice, and all of the testimony concerning the required permits and licensing, were applicable

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applicable to it would have had to fall under the regulations on "flammable solids," and not under the sections pertaining to liquids and gases. See id.

<sup>19</sup> The then fire safety regulations on explosives also contained such exemptions. See 527 Code Mass. Regs. § 13.04(1) (in accordance with provisions of G. L. c. 148, § 13, "the following quantities of explosive materials . . . shall be exempt from License, Registration, and Permit and may be kept, or stored in a building or other structure"); 527 Code Mass. Regs. § 13.04(1)(f) (exempting "[s]pecial industrial explosive devices when in quantities of less than [fifty] pounds net weight of explosives" and providing that materials falling under this exemption "may be kept, or stored in a building or other structure").

to explosives. The expert evidence at trial established that thermite is an "inflammable" or "incendiary" that operates through heat; it did not establish that thermite is an "explosive" as defined in 527 Code Mass. Regs. § 13.03.<sup>20</sup> Mansfield, the fire department lieutenant responsible for fire hazard identification, inspection, and suppression, testified that the fire department's authority to regulate the storage of thermite was derived from 527 Code Mass. Regs. §§ 13.00, which then governed explosives. Neither he nor any other Commonwealth witness explained which of the statutory or regulatory definitions pertaining to "explosives" were applicable to thermite, a substance which the expert evidence at trial established is an "inflammable" or "incendiary" that operates through heat.

The Commonwealth argues in its brief that the judge could also have taken judicial notice, albeit implicitly, of the then regulation for the use and storage of inflammables, 527 Code Mass. Regs. §§ 14.00. That regulation was not mentioned at trial, and no copy of it was introduced; nor was there any indication at trial or in the judge's reading of the verdicts

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<sup>20</sup> Gahagan described ignited thermite as undergoing a chemical reaction which creates a new chemical compound. The aluminum powder provides the fuel to the iron oxide, and they burn at a much higher temperature as the reaction occurs. The resulting reaction produces a "liquid molten metal," which cools to a slag left behind after the reaction has completed.

that the judge had considered it.<sup>21</sup> Moreover, we have not determined that a judge may, sua sponte, take judicial notice of a regulation or implicitly rely on such a regulation in reaching a verdict; when a judge takes judicial notice at a jury trial, he or she must explain that determination to the jury. See Commonwealth v. Finegan, 45 Mass. App. Ct. 921, 922 (1998); Mass. G. Evid. §§ 201, 202 (2017), citing Department of Revenue v. C.M.J., 432 Mass. 69, 76 n.15 (2000) (in criminal case, "party has right to notice of matters that court will adjudicate"). In any event, because it was the Commonwealth's burden to establish that the defendant was without lawful authority to possess thermite, it was required to prove that a specific permit or license was necessary. See Commonwealth v. Ferola, 72 Mass. App. Ct. 170, 174 & n.4 (2008) ("Even if Klonopin were a substance so designated in the United States Attorney General's regulations, see 21 C.F.R. § 1308.14 [2006], no such proof was adduced at trial").

The judge, as fact finder, was entitled to credit Mansfield's testimony that the defendant did not have a permit from the city of Worcester, a question of fact. That, however, does not answer the more fundamental question whether a permit

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<sup>21</sup> In support of this argument, the Commonwealth notes that the regulation on inflammables was mentioned in its opposition to a motion to dismiss. That motion, however, was heard by a different judge, more than a year before trial.

was required in these circumstances. Such a determination is a question of law -- the applicable regulation and the meaning of its terms -- which a reviewing court considers de novo. See, e.g., Ivey v. Commissioner of Correction, 88 Mass. App. Ct. 18, 23 (2015).<sup>22</sup> See also Town Fair Tire Ctrs., Inc. v. Commissioner of Revenue, 454 Mass. 601, 604-605 (2009).

ii. Whether a permit would have been required under 527 Code Mass. Regs. §§ 14.00. The judge did not explain his determination that the defendant lacked authority to possess thermite. Had 527 Code Mass. Regs. §§ 14.00 been proffered and considered, however, the evidence was insufficient in any event to establish the necessity of a permit. The evidence did not show that thermite fell within the definition of those inflammable materials then regulated under 527 Code Mass. Regs. §§ 14.00. Further, even were we to assume that thermite did fall within the definition of "flammable solid" in that regulation, the evidence did not establish that the amount of the substances the defendant possessed would have exceeded the

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<sup>22</sup> "'The interpretation of a regulation is a question of law which we review de novo,' Commonwealth v. Hourican, 85 Mass. App. Ct. 408, 410 (2014), applying 'the traditional rules of statutory construction,' Young v. Patukonis, 24 Mass. App. Ct. 907, 908 (1987). 'This is so because a properly promulgated regulation has the force of law . . . and must be accorded all the deference due to a statute.' Borden, Inc. [v. Commissioner of Pub. Health], 388 Mass. 707, 723, cert. denied, 464 U.S. 936 (1983)]." Ivey v. Commissioner of Correction, 88 Mass. App. Ct. 18, 23 (2015).

one hundred pound exemption from the permit requirement set forth in the regulation.

A. Inflammable solid. As stated, had 527 Code Mass. Regs. §§ 14.00, then regulating the storage and use of "flammable and combustible liquids, flammable solids or flammable gases," been considered, the evidence was insufficient to establish that it would have been applicable to thermite. There was neither expert testimony nor other evidence introduced that thermite (a solid, not a liquid or a gas)<sup>23</sup> met the definition of "flammable solid" under 527 Code Mass. Regs. § 14.02. See Commonwealth v. Green, 408 Mass. 48, 50-51 (1990) ("The Commonwealth could have easily met its burden of proof that codeine was a derivative of opium by presenting expert testimony"). The evidence that was introduced as to the properties of thermite, moreover, shows that it has none of the qualities set forth in the regulatory definition of "flammable solid" then applicable.

Pursuant to 527 Code Mass. Regs. § 14.02, a flammable solid was "[a] solid substance, other than one classified as an explosive, which is liable to cause fires through friction, through absorption of moisture, through spontaneous chemical changes, or as a result of retained heat from manufacturing or

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<sup>23</sup> The experts testified that thermite is a combination of very fine powders.

processing." Undisputed expert testimony at trial established that thermite does none of these things. It can be soaked in or made to float on water without any problem. It does not ignite through friction or spontaneous chemical changes. The act of mixing iron oxide and aluminum powder together does not generate or retain heat. Indeed, expert testimony indicated that it is very difficult to ignite thermite and that to do so requires a very particular type of high intensity external source. Even if poured on top of each other, and then lit, the particles of red iron oxide and aluminum powder that make up the thermite compound may not be in close enough contact with each other to burn.<sup>24,25</sup>

B. Exemptions for limited amounts. Even if we were to assume that thermite is an inflammable solid, nothing at trial suggested that the weight of the powders in the defendant's kitchen exceeded the regulatory exemption for individuals

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<sup>24</sup> There was expert testimony that, when using thermite in the "field" to cut or weld, a binding agent such as clay, plastic, or putty is generally used to hold the particles closely together so that they do not separate; if the individual particles of the two substances become separated, even in the same bag or pile, the mixture will not burn.

<sup>25</sup> We recognize that, in the right circumstances, thermite could pose a significant hazard once lit. The Legislature is of course free to modify the relevant statutes to incorporate thermite should it deem such modification necessary.

possessing only limited amounts of an inflammable solid.<sup>26</sup>

As the fire safety regulations for using and storing both explosives and inflammable materials then contained exemptions for limited amounts of the explosives and inflammable materials that they regulated, and provided that amounts that fell within these exemptions may be used and stored without a license or permit, the weight of the substances seized from the defendant's kitchen was essential to a determination whether a permit was required or whether the lack of a permit established the absence of lawful authority.

There was no evidence at trial concerning the weight of any of the three bags, other than as to the labeled weights on two of the bags. Even assuming that the open labeled bags contained the five and two pounds of materials indicated on their labels, however, and the entire contents of the three bags of powder were combined, the resulting seven-pound mixture would appear to be far below the exempted weight of one hundred pounds for an inflammable solid. The Commonwealth did not prove that the powders, combined, exceeded the statutory exemption.

b. Pyrotechnics. Finally, as the Commonwealth notes, the experts at trial agreed that, in chemical terms, thermite is

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<sup>26</sup> See 527 Code Mass Regs. § 14.03(2) (exempting, at time of trial, one hundred pounds of flammable solids from any license or permit requirement).

also considered to be a "pyrotechnic compound" or "composition." Based on this, the Commonwealth argues that the defendant could have been found guilty under G. L. c. 148, § 12, which prohibits the manufacturing of fireworks in a building without a license. There are two flaws in this argument. First, the defendant was not charged with having violated that statute. Second, insofar as the Commonwealth now argues that possession of a pyrotechnic without a license would separately subject the defendant to criminal penalties under G. L. c. 266, § 102, we note that pyrotechnics are excluded from the definition of "explosives" applicable to that statute. See G. L. c. 266, § 101 ("Explosive shall not include a pyrotechnic . . .").<sup>27</sup>

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<sup>27</sup> For purposes of G. L. c. 266, § 101, and G. L. c. 148, § 12, a pyrotechnic is "any commercially manufactured combustible or explosive composition or manufactured article designed and prepared for the purpose of producing an audible effect or a visible display and regulated by chapter 148 including, but not limited to: (i) fireworks, firecrackers; (ii) flares, fuses and torpedoes, so-called, and similar signaling devices."

Both Commonwealth and defense experts testified that, while thermite is defined in chemical terms as a "pyrotechnic compound" or "composition," it is not a pyrotechnic in the ordinary understanding of a firework or pyrotechnic. It also does not meet the statutory definition under G. L. c. 266, § 101, or G. L. c. 148, § 12. In those definitions, a pyrotechnic is designed to create a visible and audible effect by explosive or combustive burning. Thermite does not do either. Indeed, the Commonwealth's expert testified that thermite is used by the military to disable equipment precisely because it is silent and can be used without disclosing one's position.



3. Conclusion. Because the evidence at trial was not sufficient to establish every element of the Commonwealth's case, the defendant's convictions cannot stand. The defendant's convictions are vacated and set aside. The matter is remanded to the Superior Court for entry of required findings of not guilty.

So ordered.

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We note also that the statutes regulating pyrotechnics contain another requirement -- that a pyrotechnic be commercially fabricated -- which makes the definition inapplicable to the apparently hand-mixed substance found in the defendant's kitchen. See G. L. c. 266, § 101; G. L. c. 148, § 12.