



# WATSON GRINDING & MANUFACTURING INCIDENT

Public Safety and Homeland Security Committee

Samuel Peña, Houston Fire Chief

February 5, 2020

# Watson Grinding Incident



4699-4501 Gessner Rd

- Watson Grinding and Manufacturing, 4525 Gessner
- Business process: manufacture and service of valve and pump components
  - Specialty grinding;
  - Full-scale machine shop;
  - Specialty thermal spray coatings, High Velocity Oxygen Fuel (HVOF) coatings
  - Robotic thermal spray facility
- In business 50+ years



# IBC Chapter 3: Use and Occupancy Classification

Type of Use	General Occupancy Group	Occupancy Sub-Group
Assembly	Group A	A1, A2, A3, A4, A5
<b>Business</b>	<b>Group B</b>	<b>None</b>
Educational	Group E	None
<b>Factory Industrial</b>	<b>Group F</b>	<b>F1, F2</b>
High Hazard	Group H	H1, H2, H3, H4, H5
Institutional	Group I	I1, I2, I3, I4
Mercantile	Group M	None
Residential	Group R	R1, R2, R3, R4
<b>Storage</b>	<b>Group S</b>	<b>S1, S2</b>
Utility	Group U	None

Structures or portions of structures shall be classified with respect to occupancy in one or more of the groups listed. A room or space that is intended to be occupied at different times for different purposes shall comply with all of the requirements that are applicable to each of the purposes for which the room or space will be occupied...Where a structure is proposed for a purpose that is not specifically provided for in this code, such structure shall be classified in the group that the occupancy most nearly resembles, according to the fire safety and relative hazard involved.

- **Business, Group B:** Includes the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts
- **Factory Industrial, Group F:** Includes the use of a building or structure, or a portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as a Group H (Hazardous) or Group S (Storage)
  - F1: Moderate Hazard Factory Industrial
  - F2: Low Hazard Factory Industrial
- **Storage, Group S:** Includes the use of a building or structure, or a portion thereof, for storage that is not classified as a hazardous occupancy
  - S1: Moderate Hazard Storage
  - S2: Low Hazard Storage



# IBC Chapter 3: Use and Occupancy Classification

**High-Hazard, Group H:** Buildings or structure that involves the manufacturing, processing, or storage of materials that constitute a physical or health hazard in quantities in excess of those allowed in control areas based on maximum allowable quantity limits for control areas set forth in tables 307.1(1) and 307.1(2)

[F] TABLE 307.7(1)  
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD<sup>a,i,m,n</sup>

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE <sup>b</sup>			USE-CLOSED SYSTEMS <sup>b</sup>			USE-OPEN SYSTEMS <sup>b</sup>			
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)		
Combustible liquid <sup>c,i</sup>	II	H-2 or H-3	N/A	120 <sup>d,e</sup>	N/A	N/A	120 <sup>d</sup>	N/A	30 <sup>d</sup>			
	III A	H-2 or H-3	N/A	330 <sup>d,e</sup>	N/A	N/A	330 <sup>d</sup>	N/A	80 <sup>d</sup>			
	III B	N/A	N/A	13,200 <sup>e,f</sup>	N/A	N/A	13,200 <sup>d</sup>	N/A	3,300 <sup>d</sup>			
Combustible fiber	Loose Baled	H-3	(100)	N/A	N/A	(100)	N/A	(20)	N/A			
			(1,000)	N/A	N/A	(1,000)	N/A	(200)	N/A			
Consumer fireworks (Class C, Common)	1.4G	H-3	125 <sup>d,e,i</sup>	N/A	N/A	N/A	N/A	N/A	N/A			
Cryogenics flammable	N/A	H-2	N/A	45 <sup>d</sup>	N/A	N/A	45 <sup>d</sup>	N/A	10 <sup>d</sup>			
Cryogenics, oxidizing	N/A	H-3	N/A	45 <sup>d</sup>	N/A	N/A	45 <sup>d</sup>	N/A	10 <sup>d</sup>			
Explosives	Division 1.1 Division 1.2 Division 1.3 Division 1.4 Division 1.4G Division 1.5 Division 1.6	H-1	1 <sup>c,g</sup>	(1) <sup>c,g</sup>	N/A	0.25 <sup>e</sup>	(0.25) <sup>e</sup>	N/A	0.25 <sup>e</sup>	(0.25) <sup>e</sup>		
			1 <sup>c,g</sup>	(1) <sup>c,g</sup>	N/A	0.25 <sup>e</sup>	(0.25) <sup>e</sup>	N/A	0.25 <sup>e</sup>	(0.25) <sup>e</sup>		
		H-1 or 2	5 <sup>e,g</sup>	(5) <sup>e,g</sup>	N/A	1 <sup>e</sup>	N/A	1 <sup>e</sup>	N/A	1 <sup>e</sup>	(1) <sup>e</sup>	
			50 <sup>e,g</sup>	(50) <sup>e,g</sup>	N/A	50 <sup>e</sup>	(50) <sup>e</sup>	N/A	N/A	N/A	N/A	
		H-3	125 <sup>d,e,i</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
		H-1	1 <sup>c,g</sup>	(1) <sup>c,g</sup>	N/A	0.25 <sup>e</sup>	(0.25) <sup>e</sup>	N/A	0.25 <sup>e</sup>	(0.25) <sup>e</sup>	N/A	
H-1	1 <sup>d,e,g</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
Flammable gas	Gaseous liquefied	H-2	N/A	N/A	1,000 <sup>d,e</sup>	N/A	N/A	1,000 <sup>d,e</sup>	N/A	N/A		
			N/A	30 <sup>d</sup>	N/A	N/A	30 <sup>d</sup>	N/A	N/A	N/A		
Flammable liquid <sup>c</sup>	1A 1B and 1C	H-2 or H-3	N/A	30 <sup>d,e</sup>	N/A	N/A	30 <sup>d</sup>	N/A	10 <sup>d</sup>			
			N/A	120 <sup>d,e</sup>	N/A	N/A	120 <sup>d</sup>	N/A	30 <sup>d</sup>			
Combination flammable liquid (1A, 1B, 1C)	N/A	H-2 or H-3	N/A	120 <sup>d,e,h</sup>	N/A	N/A	120 <sup>d,h</sup>	N/A	30 <sup>d,h</sup>			
Flammable solid	N/A	H-3	125 <sup>d,e</sup>	N/A	N/A	125 <sup>d</sup>	N/A	N/A	25 <sup>d</sup>	N/A		
			UD	H-1	1 <sup>c,g</sup>	(1) <sup>c,g</sup>	N/A	0.25 <sup>e</sup>	(0.25) <sup>e</sup>	N/A	0.25 <sup>e</sup>	(0.25) <sup>e</sup>
			I	H-2	5 <sup>d,e</sup>	(5) <sup>d,e</sup>	N/A	1 <sup>d</sup>	(1) <sup>d</sup>	N/A	1 <sup>d</sup>	(1) <sup>d</sup>
			II	H-3	50 <sup>d,e</sup>	(50) <sup>d,e</sup>	N/A	50 <sup>d</sup>	(50) <sup>d</sup>	N/A	10 <sup>d</sup>	(10) <sup>d</sup>
			III	H-3	125 <sup>d,e</sup>	(125) <sup>d,e</sup>	N/A	125 <sup>d</sup>	(125) <sup>d</sup>	N/A	25 <sup>d</sup>	(25) <sup>d</sup>
			IV	N/A	NL	NL	N/A	NL	NL	N/A	NL	NL
Organic peroxide	N/A	N/A	NL	NL	N/A	NL	NL	N/A	NL	NL		
			V	N/A	NL	NL	N/A	NL	NL	N/A	NL	
			4	H-1	1 <sup>c,g</sup>	(1) <sup>c,g</sup>	N/A	0.25 <sup>e</sup>	(0.25) <sup>e</sup>	N/A	0.25 <sup>e</sup>	(0.25) <sup>e</sup>
			3 <sup>k</sup>	H-2 or H-3	10 <sup>d,e</sup>	(10) <sup>d,e</sup>	N/A	2 <sup>d</sup>	(2) <sup>d</sup>	N/A	2 <sup>d</sup>	(2) <sup>d</sup>
Oxidizer	2	H-3	250 <sup>d,e</sup>	(250) <sup>d,e</sup>	N/A	250 <sup>d</sup>	(250) <sup>d</sup>	N/A	50 <sup>d</sup>	(50) <sup>d</sup>		
			1	N/A	4,000 <sup>e,f</sup>	(4,000) <sup>e,f</sup>	N/A	4,000 <sup>d</sup>	(4,000) <sup>d</sup>	N/A	1,000 <sup>d</sup>	(1,000) <sup>d</sup>
Oxidizing gas	Gaseous liquefied	H-3	N/A	N/A	1,500 <sup>d,e</sup>	N/A	N/A	1,500 <sup>d,e</sup>	N/A	N/A		
			N/A	15 <sup>d,e</sup>	N/A	N/A	15 <sup>d,e</sup>	N/A	N/A	N/A		

[F] TABLE 307.7(1)—continued  
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD<sup>a,i,m,n</sup>

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE <sup>b</sup>			USE-CLOSED SYSTEMS <sup>b</sup>			USE-OPEN SYSTEMS <sup>b</sup>			
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)		
Pyrophoric material	N/A	H-2	4 <sup>c,g</sup>	(4) <sup>c,g</sup>	50 <sup>e,g</sup>	1 <sup>e</sup>	(1) <sup>e</sup>	10 <sup>c,g</sup>	0	0		
			4	H-1	1 <sup>c,g</sup>	(1) <sup>c,g</sup>	10 <sup>d,g</sup>	0.25 <sup>e</sup>	(0.25) <sup>e</sup>	2 <sup>c,g</sup>	0.25 <sup>e</sup>	(0.25) <sup>e</sup>
			3	H-1 or H-2	5 <sup>d,e</sup>	(5) <sup>d,e</sup>	50 <sup>d,e</sup>	1 <sup>d</sup>	(1) <sup>d</sup>	10 <sup>d,e</sup>	1 <sup>d</sup>	(1) <sup>d</sup>
Unstable (reactive)	2	H-3	50 <sup>d,e</sup>	(50) <sup>d,e</sup>	250 <sup>d,e</sup>	50 <sup>d</sup>	(50) <sup>d</sup>	250 <sup>d,e</sup>	10 <sup>d</sup>	(10) <sup>d</sup>		
			1	N/A	NL	NL	NL	NL	NL	NL	NL	
Water reactive	3	H-2	5 <sup>d,e</sup>	(5) <sup>d,e</sup>	N/A	5 <sup>d</sup>	(5) <sup>d</sup>	N/A	1 <sup>d</sup>	(1) <sup>d</sup>		
			2	H-3	50 <sup>d,e</sup>	(50) <sup>d,e</sup>	N/A	50 <sup>d</sup>	(50) <sup>d</sup>	N/A	10 <sup>d</sup>	
			1	N/A	NL	NL	N/A	NL	NL	N/A	NL	

[F] TABLE 307.7(2)  
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIAL POSING A HEALTH HAZARD<sup>a,b,c,j</sup>

MATERIAL	STORAGE <sup>d</sup>			USE-CLOSED SYSTEMS <sup>d</sup>			USE-OPEN SYSTEMS <sup>d</sup>	
	Solid pounds <sup>e,f</sup>	Liquid gallons (pounds) <sup>e,f</sup>	Gas (cubic feet at NTP) <sup>e</sup>	Solid pounds <sup>e</sup>	Liquid gallons (pounds) <sup>e</sup>	Gas (cubic feet at NTP) <sup>e</sup>	Solid pounds <sup>e</sup>	Liquid gallons (pounds) <sup>e</sup>
Corrosive	5,000	500	810 <sup>f,g</sup>	5,000	500	810 <sup>f,g</sup>	1,000	100
Highly toxic	10	(10) <sup>j</sup>	20 <sup>h</sup>	10	(10) <sup>j</sup>	20 <sup>h</sup>	3	(3) <sup>j</sup>
Toxic	500	(500) <sup>j</sup>	810 <sup>f</sup>	500	(500) <sup>j</sup>	810 <sup>f</sup>	125	(125) <sup>j</sup>



# Watson Grinding Incident



## Watson Grinding & Mfg. Occupancy Type and Use

- Business Occupancy
- Storage Occupancy: S2-Low Haz (1)
- Factory Ind. Occupancy: F1- Moderate Haz (3); F2- Low Haz (7)

## High Velocity Oxygen Fuel Spraying (HVOF)

- A thermal coating process involving the delivery of coating powder into a pre-ignited mixture of oxygen and fuel, ejected through a nozzle.
- Liquid fuel can be either propylene, hydrogen, methane, propane, acetylene, etc., mixed with oxygen.

# Watson Grinding Incident



## Occupancy Approved Permits

PERMIT TYPE	EXPIRATION
Fire Alarm Commercial Group A	Issued 3/13/2019
Compressed Gasses C7	10/01/2020
Compress Gas Non-Flam C8	12/30/2020
Cryogenic Fluids C9	03/24/2020
Flammable & Combustible Liquids Storage F7	10/01/2020
Hot Works H3 (2 Permits)	10/25/2020
Key Boxes K1	6/15/2019*
Access Gate A4	6/15/2019*

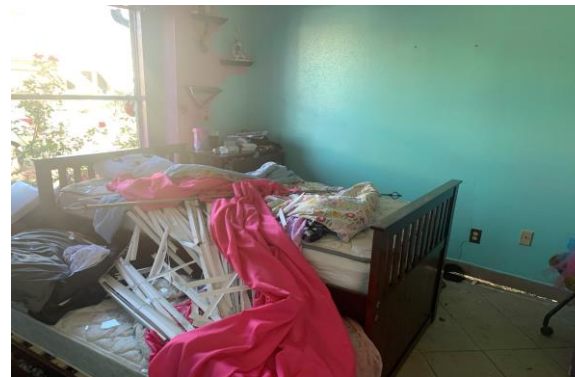
\*Expired



# Watson Grinding Incident

## Incident

- At approx. 04:24 AM on January 24, 2020 an explosion took place at the Watson Grinding and Manufacturing facility.
- Fatal injuries to 2 Watson Grinding employees and injury to 2 other employees of the company.
- Other residents from the surrounding neighborhood self-reported to area hospitals with unknown injuries, reportedly from the blast.
- Major damage to the facility. Damage to surrounding homes ranged from “Affected” to “Major”



# Watson Grinding Incident

---



## Emergency Response

- At least 44 *initial* calls to the 911 center reporting an “explosion” or “loud boom” in the area around the Watson Grinding facility
- First 911 call recorded at 04:25
- First HFD units dispatched at 04:26

## Emergency Operations

- Established Command
- Performed Scene Size-up
- Requested additional resources (including Arson, HazMat and Rescue)
- Addressed Life Safety, Incident Stabilization and Property Conservation
- Performed Search and Rescue
- Performed Atmospheric Monitoring in the immediate area (later assisted by CoH Health, TCEQ)
- Conducted windshield assessment of the impacted areas





# Watson Grinding Incident

## Initial Damage Assessments

- HFD Rescue Crews and 1<sup>st</sup> response Fire Crews performed house-to-house search and assessments in impacted neighborhoods
- Approximately 200 residential homes were assessed by HFD in the early stages of this incident
- Houston Department of Neighborhoods and Houston Public Works personnel completed Preliminary Damage Assessments January 25-26.
  - 450 Damaged (ranging from very minor to major damage)



Disclaimer: All data is made available for general reference only. Not for use for specific applications without independent verification.

# Watson Grinding Incident



## Incident Investigation

- HFD Arson Division on scene January 24, 2020 through January 31, 2020 for Cause and Origin Determination
- Entered Unified Command with BATF, HPD.
- 12 HFD Arson investigators assigned to the incident
- 30 BATF Agents, including Chemists, Engineers and field experts from their National Response Team assisted in the investigation.
- Photographed, documented and cataloged scene
- Conducted Interviews
- Over 1,500 personnel hours of investigative work.





# Watson Grinding Incident

---

## Cause and Origin

- Mission of HFD Arson and ATF investigation of Watkins Grinding Incident:
  - To determine if a deliberate criminal act was committed
  - To determine the Origin and give best professional opinion of the Cause
- Investigators were able to rule out explosives and natural gas as possible cause of the incident
- Investigation focused on the propylene product as fuel in the explosion
- Suspected propylene leak from insulated piping collected inside the warehouse and was ignited by normal arcing from a light switch, motor, or appliance as it cycled on.
- Cause is classified as Unintentional pending further forensic testing
- Final joint report (HFD/ATF) on Cause and Origin will be submitted in approximately 60 days

# Watson Grinding Incident

