HAZARDOUS SUBSTANCES HANDLING

Handling and Transport of Dangerous Goods

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INTRODUCTION

- Dangerous goods pose risks to health, property and the environment.
- Their handling and transport are strictly regulated in the EU.

CLP REGULATION

- CLP (EC No. 1272/2008) governs classification, labelling and packaging of chemicals.
- It is based on the Globally Harmonized System (GHS).

KEY ELEMENTS OF CLP LABELLING

- Hazard pictograms
- Signal words
- Hazard statements (H)
- Precautionary statements (P)
- Product and supplier identification

HAZARD PICTOGRAMS

- Visual symbols indicating the type of hazard:
- toxic, flammable, explosive, corrosive, irritant.

SIGNAL WORDS

- Danger – for severe hazards
- Warning – for less severe hazards

HAZARD & PRECAUTIONARY STATEMENTS

- H-statements – describe risks (hazard).
- P-statements – describe safety measures (prevention, protection).

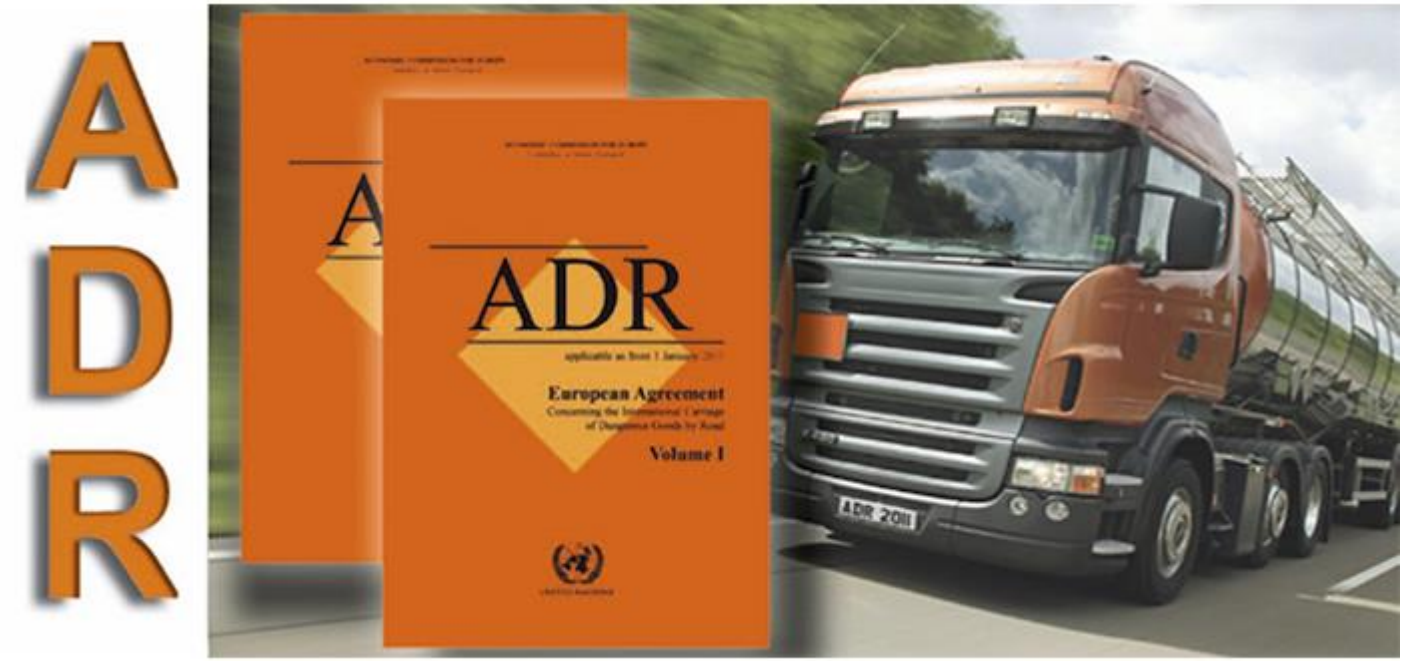
- Safety Data Sheet

TRANSPORT OF DANGEROUS GOODS

- Transport involves substances that may cause fires, explosions, or environmental harm.
- Transport regulations:
  - ADR – road
  - RID – rail
  - ADN – inland waterways
  - IMDG – sea
  - IATA – air

ADR AGREEMENT

- International agreement regulating road transport of dangerous goods.
- Updated every two years – last update 2025

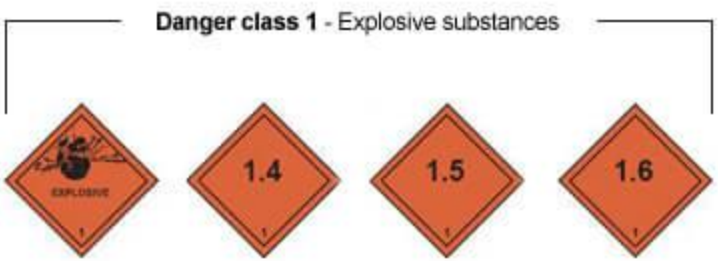


ADR CLASSIFICATION

Dangerous goods are divided into 9 classes according to risk.

Category	Name
1	Explosive materials and objects
2	Gases
3	Flammable liquid materials
4	Inflammatory solids
4.1	Self-igniting materials
4.2	Materials producing flammable gases in contact with water
4.3	Oxidizing materials
5.1	Organic materials
5.2	Organic peroxides
6.1	Poisonous materials
6.2	Infectious materials
7	Radioactive materials
8	Corrosive materials
9	Various dangerous materials and objects

ADR CLASSES


Danger class 1 - Explosive substances
1.4
1.5
1.6


Danger class 2 - Gases


Danger class 2 - Gases


Danger class 3
Flammable liquids


Danger
class 4.1


Danger
class 4.2


Danger class 4.3


Danger
class 5.1
Oxidizer


Danger
class 5.2
Organic
peroxide


Danger
class 6.1
Toxic
substances


Danger
class 6.2
Infectious
substances


Danger class 7 - Radioactive components
FISSILE


Danger
class 8
Corrosive
materials

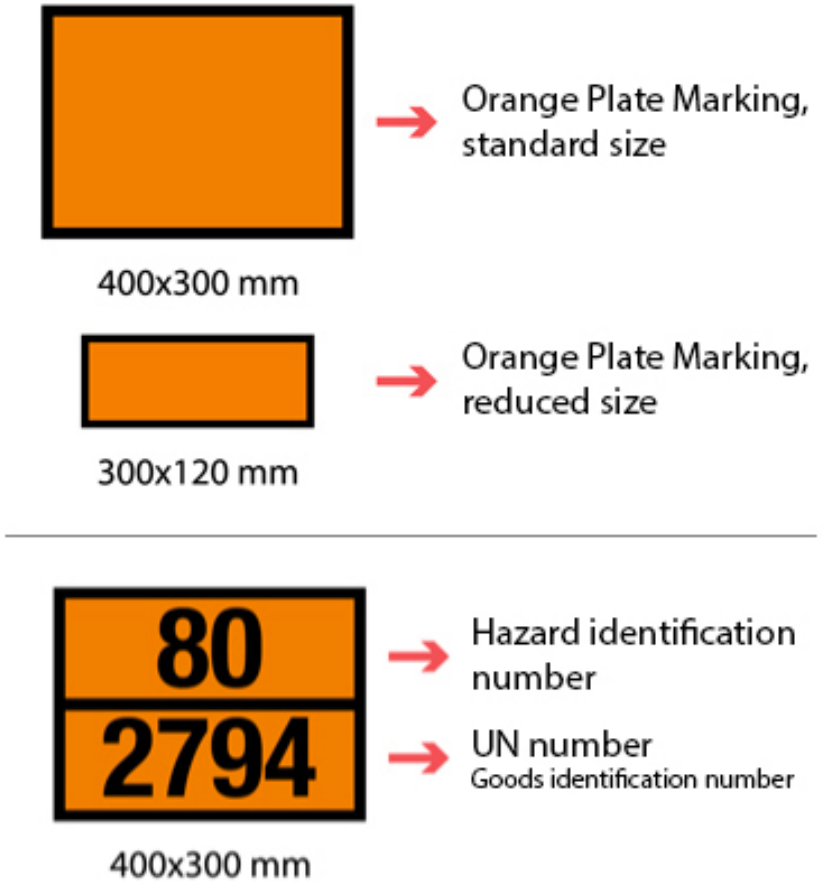

Danger
class 9
Miscelaneous
dangerous
compounds

VEHICLE MARKING

- Vehicles must be marked with orange plates and hazard placards.

ORANGE PLATES

- hazard identification number (Kemler)and UN number



HAZCHEM MARKING

- an emergency information system used to identify **dangerous substances during transport**, mainly in road tankers and storage containers
- primary purpose is to provide **quick, clear instructions for emergency responders**, especially firefighters, in the event of an accident or fire

HAZCHEM

HazChem Chart

1 – Water Jet	2 – Fog	3 – Foam	4 – Dry Agent

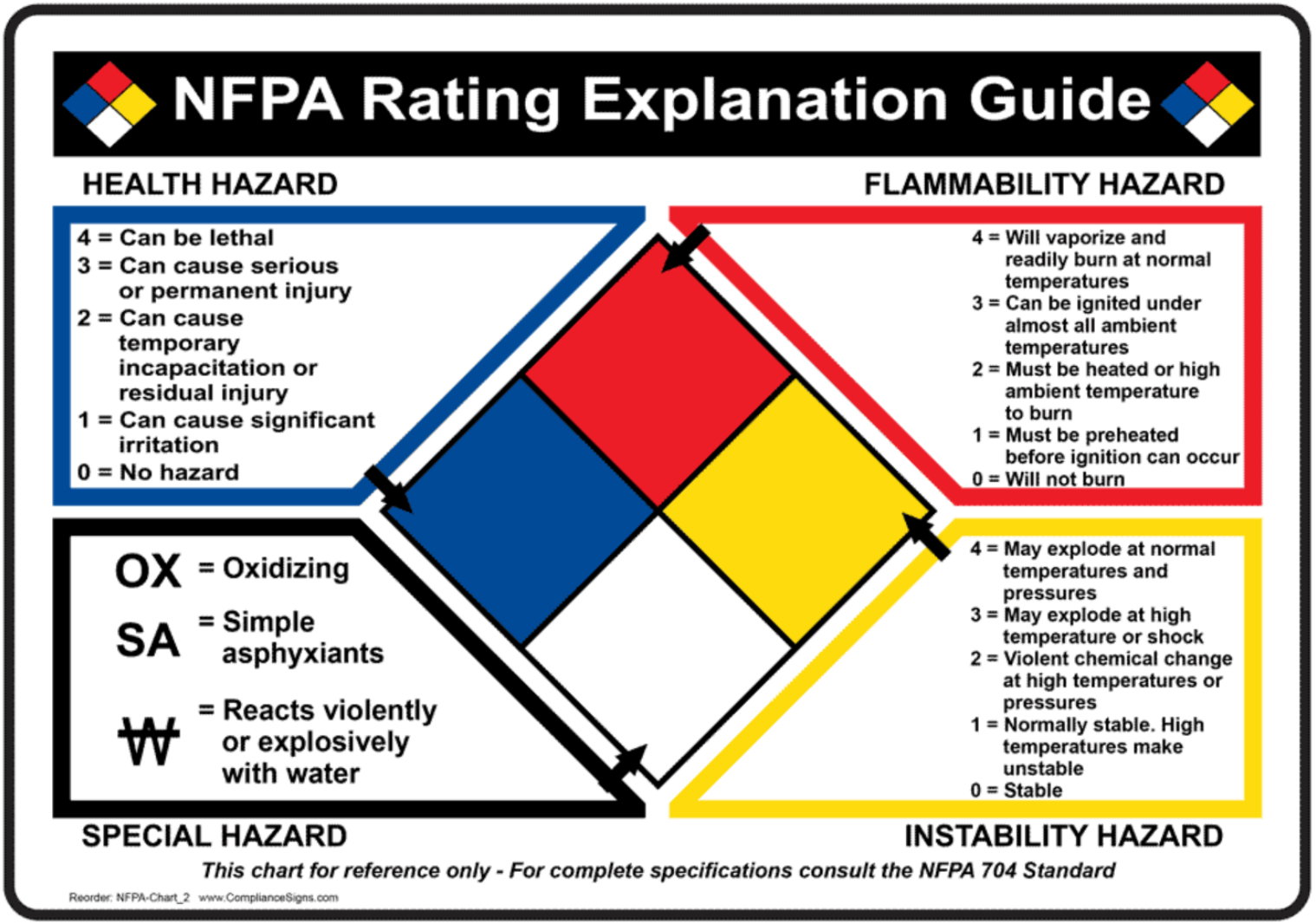
Category	Violence	Protection	Substance Control
P	V	Full	Dilute
R			
S	V	BA	
S		BA For Fire Only	
T	V	BA	
T		BA For Fire Only	
W		Full	Contain
X			
Y	V	BA	
Y		BA For Fire Only	
Z		BA	
Z		BA For Fire Only	
E	Consider Evacuation		

HAZARD DIAMOND

- NFPA 704 sign
- a visual system used to **quickly communicate the dangers of hazardous substances**, mainly for **emergency responders** such as firefighters
- **instant information** about health risks, flammability, reactivity, and special hazards
- Colors show the type of danger,

  numbers show its severity (0–4)

HAZARD DIAMOND



ADR vs. HAZCHEM vs. NFPA

- **ADR –** legal requirements for transport, classification, and vehicle marking
- **HAZCHEM – emergency response guidance** during transport incidents
- **NFPA 704 –** quick **risk assessment** for emergency responders

- ADR regulates transport, HAZCHEM guides emergency response, and NFPA 704 provides instant hazard severity information.
- Together, they form a complementary safety system.

PRACTICE MAKES PERFECT

https://learningapps.org/watch?v=pyq98joct21

https://learningapps.org/watch?v=pdu4xwjen21