

Syllabus
For The Trade of

FIREMAN

Under
Craftsmen Training Scheme (CTS)

Designed in
2011

Government of India
Ministry of Labour & Employment (DGE&T)
CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE
EN Block-81, Sector – V, Salt Lake City,
Kolkata – 700 091

List of Members present in the Trade Committee Meeting for designing the syllabus of FIREMAN under Craftsmen Training Scheme(CTS) at DELHI INSTITUTE OF FIRE ENGINEERING, NEW DELHI on 10.02.2011

Shri Anil Kumar, Director In Charge

SL NO	NAME & DESIGNATION S/SHRI	REPRESENTING ORGANIZATION	REMARKS
1	V K Garg, Chairman	Delhi Institute of Fire Engineering, New Delhi	Chairman
2	Capt Krishan Kumar, Vice Chairman	Delhi Institute of Fire Engineering, New Delhi	Member
3	Anil Kumar, Director	CSTARI, Kolkata	Member
4	Mrs Anita Srivastava, Deputy Director	DGE&T Hqrs, New Delhi	Member
5	L K Mukherjee, Deputy Director	CSTARI, Kolkata	Member
6	Dr. HS Kaparwan, Ex-Scientist F	DRDO, New Delhi	Member
7	Dr. Adarsh Kumar, Sr. Scientist	PUSA, New Delhi	Member
8	Alok Sharma, General Manager(Safety)	Indraprastha Gas Ltd., New Delhi	Member
9	Sunil Chaudhary, Asst. Director	Delhi Fire Services, New Delhi	Member
10	K S Dabas, DGM (Fire & Safety)	Indira Gandhi International Airport, New Delhi	Member
11	Jitendra Singh, Ex- Asstt. Comdt. Sr Fire Expert	Central Industrial Security Force	Member
12	Mrs. Pushpa Jindal, Principal	Govt. Sr Sec School, N Delhi	Member
13	M N Sharma, Principal	ITI, PUSA, New Delhi	Member
14	B P Minocha, Instructor	ITI, PUSA, New Delhi	Member
15	V P Jayarajan, Principal	Delhi Institute of Fire Engineering, New Delhi	Member
16	Col J N Pandey, Director Training	Delhi Institute of Fire Engineering, New Delhi	Member
17	Lt P S Bhadana, Addl Director Training	Delhi Institute of Fire Engineering, New Delhi	Member
18	Narender Krahana, Sr Instructor	Delhi Institute of Fire Engineering, New Delhi	Member
19	Arun Sharma, Instructor	Delhi Institute of Fire Engineering, New Delhi	Member
20	Sarvan, Jr Instructor	Delhi Institute of Fire Engineering, New Delhi	Member
21	Dipanshu, Jr Instructor	Delhi Institute of Fire Engineering, New Delhi	Member
22	Rajkumar, Jr Instructor	Delhi Institute of Fire Engineering, New Delhi	Member

GENERAL INFORMATION

1. Name of the Trade : FIREMAN
2. N. C. O. code No :
3. Entry Qualification :
 - a. Passed class 10th Exam. Under 10+2 system of education or its equivalent.
 - b. The minimum physical requirements are
 - i. Height - 165 cm
 - ii. Weight - 52 kg
 - iii. Chest - Normal 81 cm - Expanded 85 cm
 - iv. A registered MBBS doctor must certify that the candidate is medically fit to undertake the course
4. Duration of Craftsman Training : Six Months
5. Space Norm : Class Rooms :1 Sq meter/trainee
*10000 Sq Yard (Practical Training Area)
6. Power Norms : 2 KW
7. Trainees per unit : 20
8. Qualification of the Instructor :
 - a. Degree in Fire & Safety Engineering/Degree in Fire Science with one year experience in the relevant field.
OR
Post Graduate Diploma in Industrial Safety Engineering/ Fire and Industrial Safety Engineering with two year experience in the relevant field.
OR
 - b. Defence Officers/ JCOs/ NCOs with 10 Yrs of experience in the relevant field.

Note:* Common 10000 Sq Yard Practical Training area is required / used for three courses viz Health Safety and Environment, Fireman, Fire Technology and Industrial Safety Management, if an institute is running all the above mentioned trades.

SYLLABUS FOR THE TRADE OF FIREMAN UNDER (CTS)

Week No.	Theory	Practical
1	<p>Importance of safety and general precautions observed in the Institute and in the section. Importance of the trade in the development of Industrial economy of the country. What are the related instructions, subjects to be taught, achievement to be made, recreational facility, medical facilities and other extra curricular activities of the Institute. (All necessary guidance to be provided to the new comers to become familiar with the working of Industrial Training Institute system including stores procedures, Safe and proper usage of electric and water resources. Introduction of First aid. Road safety. Operation of electrical mains. Introduction of safety kits.</p>	<p>Familiarization with the Institute, Documentation of Student, Issuance of Dress, Books, Hostel Accommodation (If required) and Store. Importance of trade training, Equipments used in the trade, types of work done by the trainees in the trade. Introduction to safety equipments and their uses. Introduction of first aid, Road safety, operation of Electrical mains.</p>
2	<p>Basics of Physics & Chemistry related to Fire . Physical properties of matter, Definition of Density, Relative density, Effects of density on behaviour of gases, Vapour density, Melting & Boiling point, introduction to Heat and Combustion, Measurement of temp and conversion of their scales, Definition of Flammable liquids, Gases & vapors, sp heat, latent heat.</p>	<p>Associated Safety Hazards & risk, Occupational Health Hazards and associated environment related issue.</p> <p>Demonstration of the properties of various</p> <ul style="list-style-type: none"> • Alkalies • Acids • Gases • Organic flammable liquids and commonly used industrial chemical <p>Fire-fighting technique</p>
3	<p>Anatomy of Fire Definition of Combustion, Elements of Combustion, Products of Combustion, Flash point, Fire point, Ignition temperature and spontaneous combustion.</p> <p>Classification of Fires. Classification of Fire and types of extinguishers, maintenance, method of operation.</p>	<p>Familiarization and demonstration of First Aid Extinguishers</p> <p>Fire Extinguisher Drills Drill I : Water CO2 Extinguisher Drill 9L Drill II : Chemical Foam Extinguishing 9 L Drill III : Mechanical Foam Extinguisher 9L Drill IV : Stored Pressure Water Extinguisher 9 L</p>

	Techniques of fire extinction- Smothering cooling and starvation. Care and Maintenance of First Aid Fire Extinguishers.	Drill V : Dry Chemical Powder 5 Kg Drill VI : Dry Chemical Powder 10 Kg Drill VII : ABC Extinguisher 5 Kg/ 10 Kg Drill VIII : CO2 Extinguisher 4.5 Kg Method of recharging after discharge, General maintenance.
4	Extinguishing Media and Foam Making Equipment. Water as an extinguishant- its merits, demerits and modification. Introduction to all types of foam concentrate, properties of foams and techniques of extinguishment by foam, types of foams, Characteristics of good foam, foam making Equipment- Mechanical. High Expansion and Low Expansion Foam. Storage of foam Compound. Dry Chemical Powder- Types and application. Carbon dioxide as extinguishant.	Familiarization of foam making branch and use of FB2X, FB5X and FB10X. Fire Extinguisher Drills Drill I : Water CO2 Extinguisher Drill 9L Drill II : Chemical Foam Extinguishing 9 L Drill III : Mechanical Foam Extinguisher 9L Drill IV : Stored Pressure Water Extinguisher 9 L Drill V : Dry Chemical Powder 5 Kg Drill VI : Dry Chemical Powder 10 Kg Drill VII : ABC Extinguisher 5 Kg/ 10 Kg Drill VIII : CO2 Extinguisher 4.5 Kg Method of recharging after discharge, General maintenance.
5	Hose and Hose Fittings. Type of Suction & Delivery Hoses, Material used in Construction. Hose-reel, and Causes of decay, Operational use of Hose, Storage, Care & Maintenance. Repairing and Binding of Hose, Coupling and Collecting head adopters, Nozzles.	Familiarization and demonstration of Hose and Hose fittings Drill – I : Hose pick up Drill Drill – II : Hose Running Drill with one hose Drill – III : Hose Running with two hose Drill – IV : Hose Running with Three hose
6	Hydraulics. Introduction & Units of measuring Length, Area and Volume of regular and irregular shapes, Pressure & their conversion, Principal Characteristics of pressure and pressure head. Calculation of capacity of tanks of different shapes & sizes.	Demonstration of effect of pressure on pump discharge rate and on ground use of pressure pumps. Techniques to Handle various branches. Quiz Competition for the syllabus Covered Industrial/ Fire Service Station Visit

7	<p>Source of Water Supply. Construction, Capacity and use, Open Source- SWT, Capacity, Ponds, Rivers, Streams, Sea. Hydrants- Types & Uses. Over Head Tanks- Capacity and Use.</p>	<p>Familiarization and demonstration of Hydrant and its associated equipments.</p> <p>Hydrant Drill I : Opening of single line of three hoses.</p> <p>Hydrant Drill II : Change of burst hose</p> <p>Hydrant Drill III : Increase one length hose</p> <p>Hydrant Drill IV : Decrease one length hose</p> <p>Hydrant Drill V : Use of Collecting, breaching</p> <p>Hydrant Drill VI : Disconnect collecting breaching</p>
		<p>Hydrant Drill VII : Use of Dividing Breaching</p> <p>Hydrant Drill VIII : Disconnect of Dividing Breaching</p>
8	<p>Pump and Primers. Classification of common pumps in use in Fire Service and its types, centrifugal pump, its parts, construction & their function, different types of primers, Reciprocating and Gas Ejector primers, Care and Maintenance, introduction to Cooling Systems & its importance.</p>	<p>Familiarization and demonstration of Centrifugal pump, water tender drill with open and closed water.</p> <p>Drill I : Pen water pump drill (Dry Drill)</p> <p>Drill II : Lose water pump drill with hard/soft suction.</p>
9	<p>Fixed Installations. Water Based Risers Mains- Wet riser, Dry riser, Hose reel installation, use and maintenance, Introduction to hydrants.</p> <p>Non Water Based Foam Base- Foam pourer, DCP, CO2, Based installation use and maintenance.</p>	<p>Familiarization and demonstration of fixed installation at visit to high rise building.</p> <p>Familiarization and demonstration of Hydrant and its associated equipments.</p> <p>Hydrant Drill I : Opening of single line of three hoses.</p> <p>Hydrant Drill II : Change of burst hose</p> <p>Hydrant Drill III : Increase one length hose</p> <p>Hydrant Drill IV : Decrease one length hose</p> <p>Hydrant Drill V : Use of Collecting, breaching</p> <p>Hydrant Drill VI : Disconnect collecting</p>

		breaching Hydrant Drill VII : Use of Dividing Breaching Hydrant Drill VIII : Disconnect of Dividing Breaching
10	Automatic Fire Detection cum Alarm System Types of Detectors- Smoke, Heat, Flame/Gas Detectors, Operating principles, Control Panel and MCP criteria for their use and maintenance.	Familiarization and demonstration of Smoke detectors, Heat Detector, Flame Detectors, Gas Detector. Demonstration of Control Panel Industrial/ Fire Service Station Visit Quiz Competition for the syllabus Covered
11	Ladders Introduction of Types of ladders, Extension Ladder, Hook Ladder, Use, Care and maintenance of ladders, Pitching of Ladders, Parts and Components.	Extension Ladder Drill Introduction of parts of extension ladder, Drill I : Pitching of ladder Drill II : Climbing the ladder Drill III : Use leg Lock Drill IV : Ladder Drill with Fireman Lift Drill V : L2 Drill
12	Internal Assessment Test (2 Days) Rope and Knots Introduction and use of lines. Causes of deterioration, inspection of lines, care and Maintenance, Standard knots and their uses.	Types of Knots and their uses. Drill I : Thumb Knots Drill II : Figure of 8 knots Drill III : Reef Knot Drill IV : Chair Knot Drill V : Half Hitch - Clove Hitch - Rolling Hitch - Tender Hitch Drill VI : Bowline
13	Small & Special Rescue Gears Different types of small gears, Fireman Axe, Ceiling Hook, Crowbar, Door breaker, Padlock removers, Spreader, Cutters, Lifting Equipment and different type of Saw used during fire fighting & rescue techniques. Fire Fighting Appliances	Visit to Fire Service Station. Familiarization with various types of Fire Fighting Small and Special rescue gear. Familiarization of Water Tender. Drill I : L-2 Drill with ladder and water tender Drill II : Foam Drill with FBI0X single delivery

	Introduction of Portable fire pump, Capacity, Use and maintenance. Fire tender, Types, Use and maintenance. Foam Tender- General Requirements, use, Operation and Maintenance special Appliances.	Drill III : Foam Drill with FB5X single delivery Drill IV : Wet Drill with double delivery Drill V : Dry Drill with double delivery
14	Building Construction Building Materials and their behaviour under fire conditions, Signs of building collapse and rescue operation, Importance of fire escapes with respect to their positioning for construction and provisioning of fire fighting measures.	Visit to Construction Site Extension Ladder Drill Introduction of parts of extension ladder, Drill I : Pitching of ladder Drill II : Climbing the ladder Drill III : Use leg Lock Drill IV : Ladder Drill with Fireman-Lift Drill V : L2 Drill
15	Electricity & Fire Hazards General Introduction, Fundamentals of electricity, Common Causes of electrical fires and its remedial measures, Electrical Hazards, protective measures and fire fighting procedure.	Demonstration and Determination of related electrical experiments Quiz Competition for the syllabus Covered
16	Breathing Apparatus Introduction of BA Set, Types of BA Sets in use, Components and function. Working Principles of normal compressed air BA set and its Station maintenance.	Familiarization and Demonstration of Parts of BA Set. Drill – I Donning, running and Rescue of casualty through Tunnel
17	Practical Firemanship Duties & responsibilities of fire crew at a fire station & Fire Ground. Methods of entry, Rescue & fire fighting in smoke logged building. Fire Service Organisation Introduction of Fire Service Organisation, Writing and importance of occurrence book, Duty Card/Register, Fire reports, Log	Methods of entry into building, searching of building of location of higher. Drill I : Rescue drill in smoke laden building. Writing practices of 1) Occurrence Book 2) Duty Card/ Register 3) Log Book 4) Hose Book

	books, Hose Book, Stock Registers, Leave Register etc. Station discipline and watch room procedure.	5) Stock Register Fire Service Station Visit
18	Rural Fires Fire hazards in grasslands, Forest areas, rural areas and hay stacks. Causes of fire, Special appliances and equipment used. Methods of fire fighting in rural area	Drill I : Fighting Hay Stack fire Fire Extinguisher Drills Drill I : Water CO2 Extinguisher Drill 9L Drill II : Chemical Foam Extinguishing 9 L Drill III : Mechanical Foam Extinguisher 9L Drill IV : Stored Pressure Water Extinguisher 9 L Drill V : Dry Chemical Powder 5 Kg Drill VI : Dry Chemical Powder 10 Kg Drill VII : ABC Extinguisher 5 Kg/ 10 Kg Drill VIII : CO2 Extinguisher 4.5 Kg
19	Special Service Introduction, Methods employed by fire Service to rescue trapped persons in lifts, Sewer, Trapped under vehicle, Debris of Collapsed building and Wells, Rescue of human beings/ animals from ponds & Rivers.	Picking up, Lowering & Carrying Casualty, Rescue by lines and blocks, Fireman Lift Drill. Fire Service Station Visit
20	Medical First-Aid Definition of first-aid, Quality of First Aider, Shock-sign and Symptoms, Asphyxia-Sign and Symptoms, Wounds and Hemorrhage-Classification of injuries, signs, symptoms and management of Burns, its severity. Scalds and frost bites, Signs and symptoms of management of heart attack. Fractures –Causes, types, Signs and symptoms, management, Sprain & dislocation –Sign & symptoms management & observation of patient, Snake Bites- Treatment & Management. Resuscitation-Different methods.	Familiarization and study First Aid Box Techniques of CPR I) One Sitter II) Two Sitter III) Three Sitter IV) Four Sitter V) Fireman lift VI) CPR drill VII) Choking VIII) Shaffer's Method IX) Rescue drill X) Sylvester's Method XI) Holgar Nielsen Method

		XII) Eve Rocking Stretcher Method XIII) Emerson Method XIV) Mouth to Mouth Respiration. Stretcher Drill Fireman Lift Drill Use Bandage Standard drills on Ambulance
21 to 24	Industrial Training (Attached with Industries for On the Job Training)	Industrial Training(Attached with Industries for On the Job Training)
25	Revision	Revision
26	Final Examination (NCVT)	

LIST OF TOOLS & EQUIPMENTS FOR ONE BATCH (20 Trainees)

TRADE : FIREMAN

S.No	NAME OF THE TOOLS & EQUIPMENTS	QUANTITY
1.	Water CO2 Type Fire Extinguisher (9 Ltrs)	06
2.	Stored pressure Type Fire Extinguisher (9 Ltrs)	06
3.	Chemical Foam type Fire Extinguisher (9Ltrs)	06
4.	Mechanical Foam type Fire Extinguisher 9Ltrs	06
5.	CO2 Type Fire Extinguisher (4.5 Kg)	06
6.	BC Type Fire Extinguisher 5/10 Kg	04
7.	ABC Type Fire Extinguisher 5/10 Kg	04
8.	Extension Ladder (Size)45/35 ft	* 02
9.	All types of Branches or Nozzles	* 04
10.	Fire Hose	* a) 15m b) 30m 10 04
11.	First Aid Box	* 02
12.	All Types of small gears	* 1 Set
13.	BA Set (Negative & Positive Pressure)	* 02
	a) Gas Cylinders	02
	b) Steel Back Plates	02
	c) Face Masks	02
14.	Portable Fire Pump / TFP	* 02
15.	All types of couplings	* 1 Set
16.	Hydrant-Stand Pipe Type	* 02
17.	Fire Trays	* 02
18.	Manual call point	* 01
19.	Entry Suit/ Proximity Suit	* 02
20.	Hose reel system	* 01

21.	Nitrogen Cylinder	*	01
22.	Hose Box	*	01
23.	Fire Fighting Point complete Set	*	01
24.	Section Hose 10 ft	*	02
25.	Section Wrench	*	02
26.	Metal Strainer	*	02
27.	Basket Strainer	*	01
28.	Sprinkler	*	02
29.	Ropes 100 ft Long	*	01
30.	Lines 100 ft Long	*	01
31.	Control Panel – Model	*	01
32.	Helmet		20
33.	Plastic Tunnel (Sewer Rescue Drill)	*	01
34.	Collecting Breeching	*	02
35.	Dividing Breeching	*	02
36.	Hydrant Flange	*	02
37.	Hydrant Key & Bar (With hydrant Spindle)	*	01
38.	Adopter for Air Store Pressure	*	02
39.	Sprinklers Head (Bulb Type, Fusible Type)	*	02
40.	Computer System	*	03
41.	Computer Table	*	03
42.	Computers Chairs	*	03
43.	White Board	*	01
44.	L.C.D. Projectors	*	01
45.	UPS 650 VA offline	*	03
46.	All types of Detectors 1 Pcs. of each	*	04
47.	Cut model of Fire Extinguisher	*	02
48.	Fire Suit	*	02
49.	Fire Tender (one for the Institute)	*	01
50.	Extension Ladder (Size)45/35 ft	*	01

51.	All types of Branches or Nozzles	*	
52.	Fire Hose	*	
53.	c) 15m		
54.	d) 30m		
55.	First Aid Box	*	
56.	All Types of small gears	*	
57.	BA Set (Negative & Positive Pressure)	*	
58.	b) Gas Cylinders		
59.	d) Steel Back Plates		
60.	e) Face Masks		
61.	Portable Fire Pump / TEP	*	
62.	All types of couplings	*	
63.	Hydrant-Stand Pipe Type	*	
64.	Fire Trays	*	
65.	Manual call point	*	
66.	Entry Suit/ Proximity Suit	*	
67.	Hose reel system	*	

LIST OF UNIFORM FOR ONE BATCH

1.	Uniform	
	1. Uniform set	2 SET EACH
	2. Combat Dress	2 SET EACH
	3. PT Kit	2 SET EACH
	4. Track Suit	2 SET EACH

*Note :In the above list of tools and equipments, the items bearing star mark are meant to be used for three courses viz Health Safety and Environment, Fireman, Fire Technology and Industrial Safety Management. If a institute is running all the above mentioned trades , items bearing star mark are not required to be purchased separately .