REAL WORLD CHIMNEY INSPECTIONS

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THIS WORLD IS NOT PERFECT NEITHER ARE THE CHIMNEYS

LET'S GET STARTED

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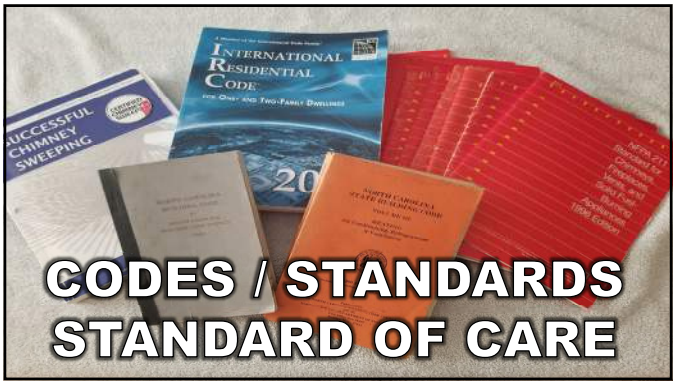
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THE PURPOSE OF THE CHIMNEY INSPECTION

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WHAT, AND WHO, IS THE INSPECTION REALLY FOR

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THE GOAL OF THE INSPECTION

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THE GUIDELINES

NFPA 211 COMPANY SOPS

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NFPA 211 STANDARD FOR CHIMNEY INSPECTION

LEVEL 1
READILY ACCESSIBLE CHIMNEY
ACCESSIBLE APPLIANCE AND CONNECTOR PIPE

LEVEL 2
ACCESSIBLE PARTS OF CHIMNEY, CONNECTOR & APPLIANCE

LEVEL 3
INACCESSIBLE / CONCEALED AREAS

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THE EXPECTATION OF THE CHIMNEY OR VENT

CONTAIN THE COMBUSTION PRODUCTS DURING THEIR TRAVEL

EXHAUST THEM FULLY TO THE OUTSIDE ATMOSPHERE

RESIST THE EFFECTS OF THE ELEMENTS

ASSIST THE APPLIANCE IN OPERATING PROPERLY USING DRAFT AND FLOW

PROTECT THE OCCUPANTS & STRUCTURE FROM THE ILL EFFECTS OF THE COMBUSTION PRODUCTS

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THE CHIMNEY, VENT & FIREPLACE IS ATTACKED BY

ACIDS IN THE COMBUSTION PRODUCTS

LACK OF PROPER MAINTENANCE

FROM EXTERNAL FORCES (SETTLEMENT, LIGHTNING, TORNADOS, HIGH WINDS, HURRICANES)

FROM EVERYDAY FORCES (RAIN, FREEZE/THAW, CONSTANTLY CHANGING ENVIRONMENT, ULTRAVIOLET RAYS)

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FURTHER COMPROMISED BY

USE OF IMPROPER / SUBSTANDARD MATERIALS DURING CONSTRUCTION

BAD WORKMANSHIP

FAILURE TO FOLLOW CODES & STANDARDS

FAILURE TO FOLLOW MANUFACTURERS INSTRUCTIONS

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THE MAJOR ISSUES & FAILURES OF FIREPLACES, CHIMNEYS & VENTS

CONCEALED CLEARANCE ISSUES TO COMBUSTIBLE FRAMING

WATER ENTRY ISSUES

PRESSURE ISSUES / LACK OF COMBUSTION AIR

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EVOLUTION



WOOD > MASONRY > WOOD

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SYSTEMS WILL BE FOUND THAT ARE FACTORY-BUILT OR SITE-BUILT





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SITE BUILT MASONRY CHIMNEYS ARE CONSIDERED AS ALL FUEL

FACTORY BUILT CHIMNEYS MAY BE ALL FUEL & ARE REFERRED TO AS CHIMNEYS

FACTORY BUILT UNITS MAY BE RESTRICTED TO CERTAIN FUELS, THEN THEY ARE REFERRED TO AS VENTS, AND ARE NOT CONSIDERED A CHIMNEY

CHIMNEYS ARE ALL FUEL
VENTS ARE RESTRICTED TO FUELS THEY ARE LISTED FOR

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SITE BUILT ARE BUILT OF MASONRY MATERIALS
BRICK, BLOCK, STONE, MORTAR
THEY SHOULD FOLLOW CODE AT THE TIME OF CONSTRUCTION
THE FLUE SHOULD BE LINED

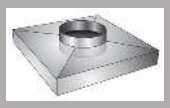
FACTORY BUILT UNITS WILL BE MANUFACTURED OF METAL OR MASONRY (SOME VENTS ARE PLASTIC)
STANDARDS WILL BE THE LABORATORY LISTING, NOT CODE

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FACTORY BUILT UNITS ARE MANUFACTURED AS A SYSTEM AND ALL COMPONENTS ARE EITHER MADE BY OR SPECIFIED BY THE MANUFACTURER

THE CHASE COVER ON A CHASE IS NOT A PART OF THE MANUFACTURED SYSTEM AND USUALLY FIELD FABRICATED


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CHASE VENTILATION OFTEN REQUIRED

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SITE BUILT MASONRY CHIMNEYS AND FIREPLACES ARE USUALLY CONSTRUCTED FROM COMMON MASONRY MATERIALS BOUGHT LOCALLY AND ASSEMBLED BY THE MASON

- BRICK
- FIREBRICK
- MORTAR
- REFRACTORY MORTAR
- CEMENT
- FLUE LINING
- DAMPER
- CLEAN-OUT DOOR

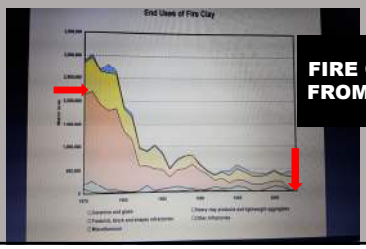
MAY USE A STEEL-FORM FIREBOX IN PLACE OF FIREBRICK, DAMPER & REFRACTORY MORTAR

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USE OF MASONRY HAS DECREASED
USE OF FACTORY BUILT HAS INCREASED
OVER LAST 60 YEARS
1960'S USE OF MASONRY WAS OVER 95%
NOW FACTORY BUILT IS OVER 95%



FIRE CLAY SALES FROM 1975 - 2000

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FUELS USED BY CONSUMERS

WOOD
COAL
PELLETS
FUEL OIL
NATURAL GAS
LP GAS
BIOFUEL
ELECTRIC

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CONSTRUCTION CODES & STANDARDS HAVE CHANGED OVER THE LAST 120 YEARS

AS SUCH KNOWING THE AGE OF THE HOME WILL OFTEN ALERT THE INSPECTOR TO ISSUES





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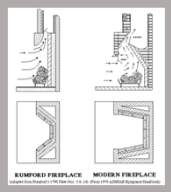
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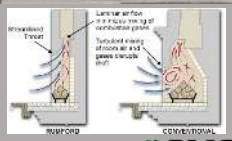
24

FIRST FIREPLACE RESEARCH WAS IN THE 18TH CENTURY
COUNT RUMFORD
BENJAMIN FRANKLIN
THOMAS JEFFERSON









RUMFORD FIREPLACE MODERN FIREPLACE

RUMFORD CONVENTIONAL

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FLUE LINING STARTED BEING USED IN LATTER PORTIONS OF THE 19TH CENTURY, EARLIEST RECORDED USE WAS 1878

PURPOSE

"TO PROTECT THE FRAGILE CHIMNEY WALLS FROM THE CORROSIVE EFFECTS OF THE COMBUSTION GAS"



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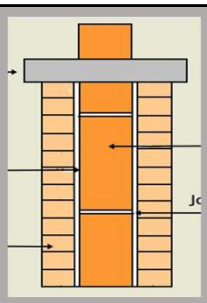
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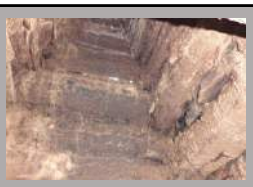
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USE OF WOOD AS A MATERIAL FOR CHIMNEY CONSTRUCTION WAS NOT RECOGNIZED AS A DANGER UNTIL EARLY PART OF THE 20TH CENTURY

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LATE 19TH CENTURY MANUFACTURED FIREBOXES USED
A PART OF MANY SEARS HOMES SHIPPED FROM CHICAGO UNTIL 1930s



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1927 STEEL FORM FIREPLACE UNITS
ROLLED OUT OF THE
CHEMICAL TOILET COMPANY
LATER KNOWN AS HEATILATOR COMPANY

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FACTORY BUILT CHIMNEYS WERE FIRST LISTED FOR USE BY UNDERWRITER'S LABORATORY 1949

VAN PACKER AND VITROLINER

FACTORY-BUILT ZERO CLEARANCE FIREPLACE INVENTED & UL LISTED 1952 BY ROBERT THULMAN

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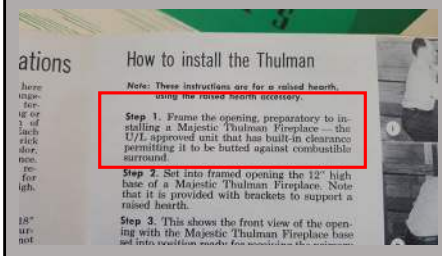


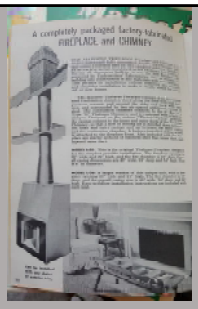


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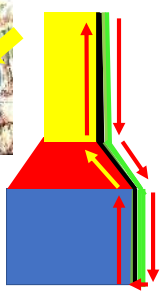


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THERMOSIPHON FIREPLACE & CHIMNEY

AIR ENTERS THE OUTER CHIMNEY CAVITY GOES BACK UP THE INNER CHIMNEY CAVITY

SOME UNITS HAVE AIR ENTRY IN CHASE AREA

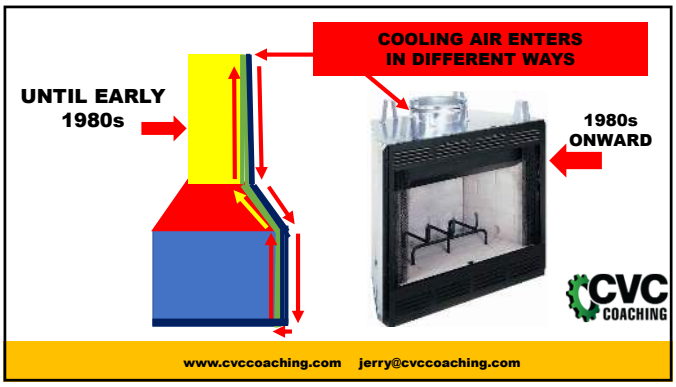
SAME PRINCIPAL ON THERMOSIPHON CHIMNEY

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Triple-wall metal chimney
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COOLING AIR ENTERS IN DIFFERENT WAYS
UNTIL EARLY 1980s
1980s ONWARD
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Thermo-Siphoning Principle
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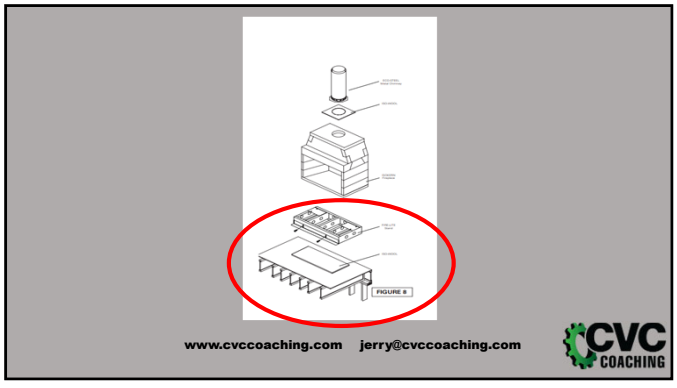
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MID 1980s

VENT FREE GAS
B-VENT GAS
GAS LOGS
DIRECT VENT GAS

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1980s CHANGES

FACTORY BUILT FIREPLACE STOPPED BEING THERMOSIPHON
SMOKE CHAMBERS STARTED TO REQUIRE PARGING
VIDEO CHIMNEY INSPECTION DEVICE MARKETED

1990s
NON-WATER SOLUBLE REFRACTORY SPECIFIED

2000
NFPA 211 INTRODUCED 3 LEVELS OF CHIMNEY INSPECTION

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NFPA 211 STANDARD FOR CHIMNEY INSPECTION

LEVEL 1
READILY ACCESSIBLE CHIMNEY
ACCESSIBLE APPLIANCE AND CONNECTOR PIPE

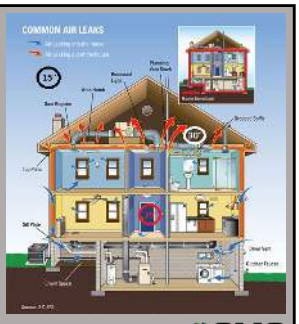
LEVEL 2
ACCESSIBLE PARTS OF CHIMNEY, CONNECTOR & APPLIANCE

LEVEL 3
INACCESSIBLE / CONCEALED AREAS

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LATTER PART OF
20TH CENTURY WE ADDED
PROBLEMS WITH PRESSURES

LESS AIR FOR COMBUSTION
MORE EFFICIENT HEATING SYSTEMS
COOLER FLUE GAS TEMPERATURES
HIGHER ACID CONTENTS OF GASES



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CHIMNEYS, VENTS & FIREPLACE INSPECTION PRIORITIES INCLUDE

DOES IT PERFORM / WORK?
HAS IT BEEN MAINTAINED?
IS IT PROTECTED FROM THE ELEMENTS?
WERE PROPER MATERIALS AND METHODS UTILIZED?
DOES IT PRESENT A POTENTIAL HAZARD?

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IT'S EASY TO SEE THE OBVIOUS

BUT THIS IS AFTER THE ATTACK HAS BEEN ONGOING



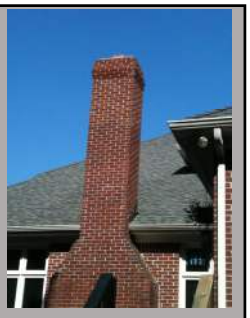
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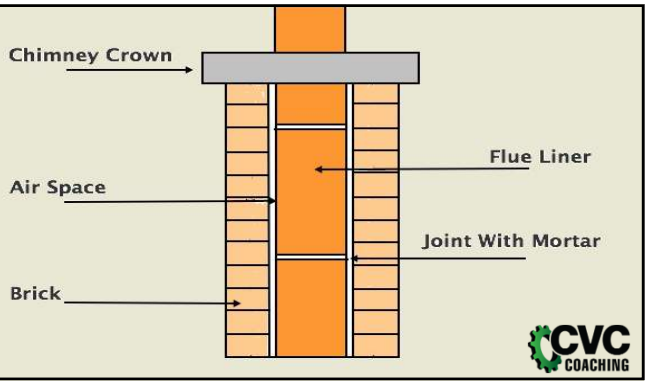




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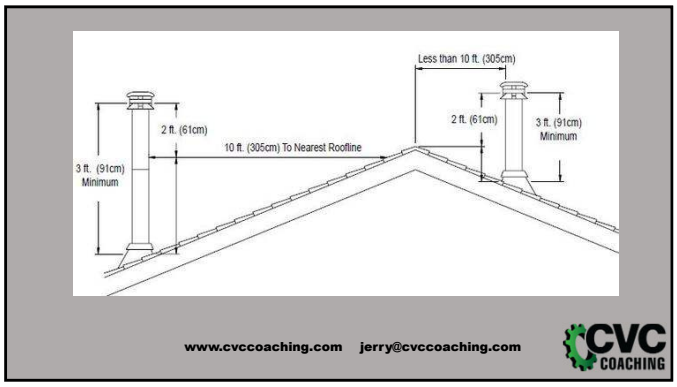
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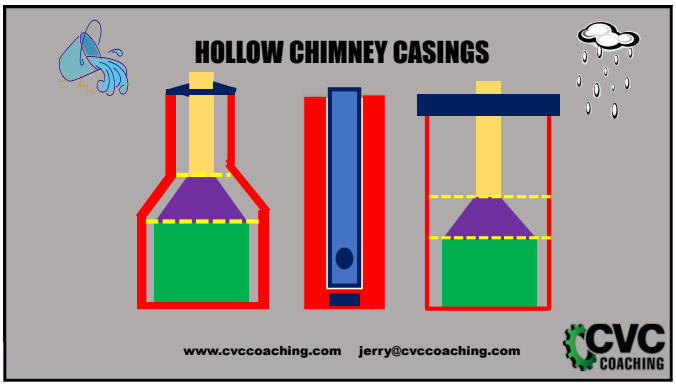


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Less than 10 ft. (305cm)
2 ft. (61cm)
10 ft. (305cm) To Nearest Roofline
2 ft. (61cm)
3 ft. (91cm) Minimum
3 ft. (91cm) Minimum
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HOLLOW CHIMNEY CASINGS
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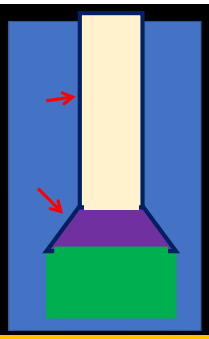

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IN THEORY THE AREA WITH THE DARK BLUE OUTLINE IS INTENDED TO BE GAS TIGHT

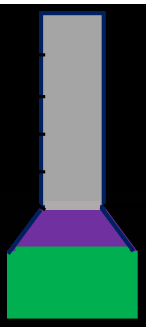


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REALITY SELDOM MEETS THEORY



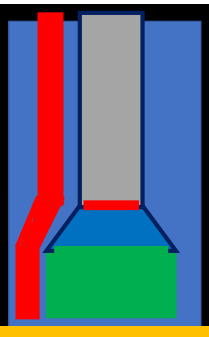
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ADDING ANOTHER FLUE ADDS TO THE EXCITEMENT

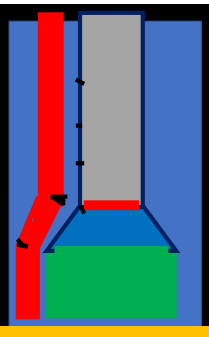


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ADD ANOTHER FLUE



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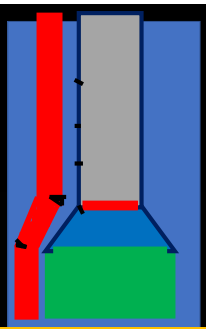
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NOW THE PRESSURE IS ON, SOMETIMES POSITIVE & SOMETIMES NEGATIVE

POSITIVE

NEGATIVE

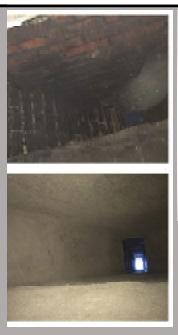


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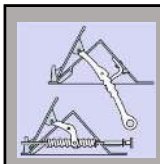




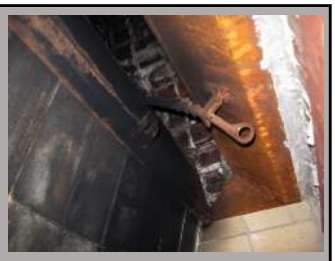
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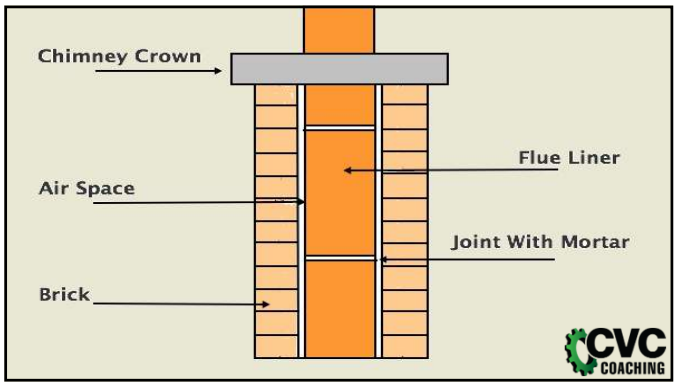
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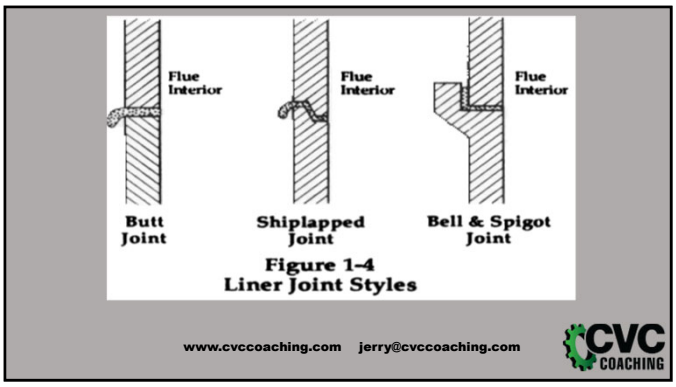
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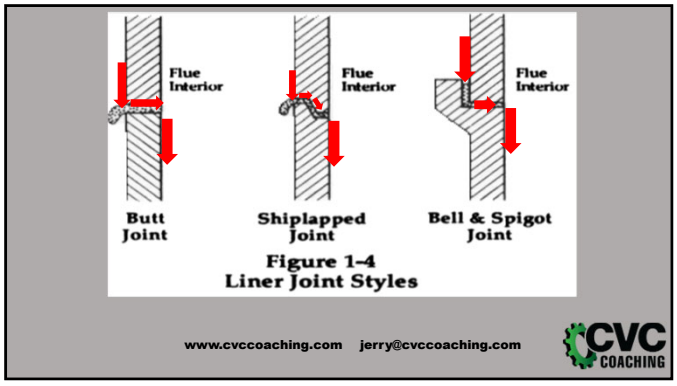
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Chimney Crown
Flue Liner
Air Space
Joint With Mortar
Brick
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Flue Interior
Flue Interior
Flue Interior
Butt Joint
Shiplapped Joint
Bell & Spigot Joint
Figure 1-4
Liner Joint Styles
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Flue Interior
Flue Interior
Flue Interior
Butt Joint
Shiplapped Joint
Bell & Spigot Joint
Figure 1-4
Liner Joint Styles
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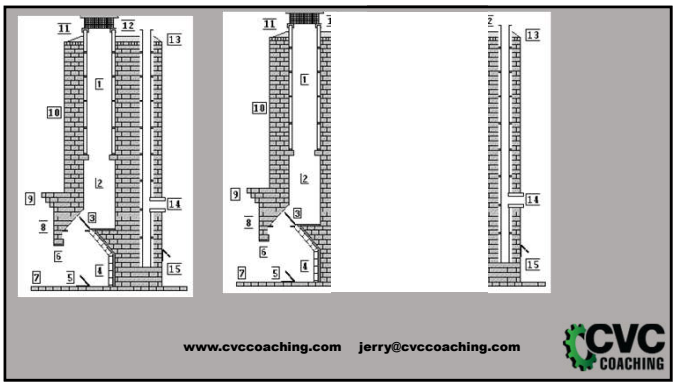
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High Performance Engines Require Gasketing!
So Does A High Performance Vent System!
Leakage Is An Issue No Matter If Positive Or Negative!
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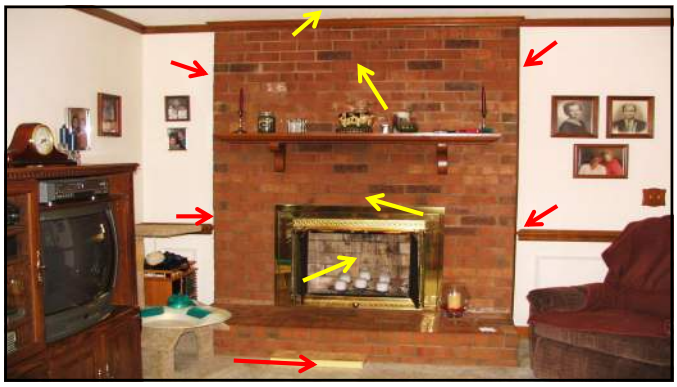
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HOUSE 1949 / 4 HOURS CONTINUOUS USE OF LOGS
LOG SET INSTALLED 15 TO 20 YEARS

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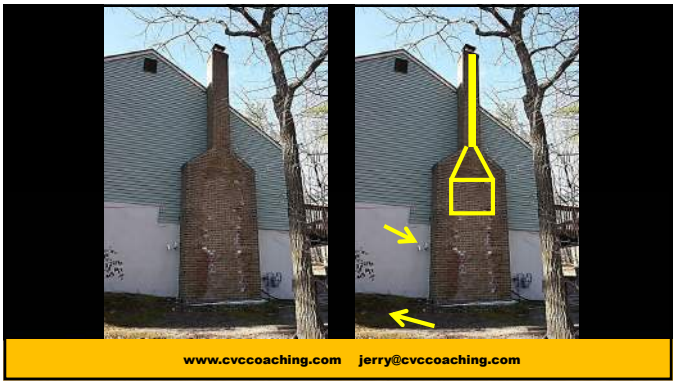
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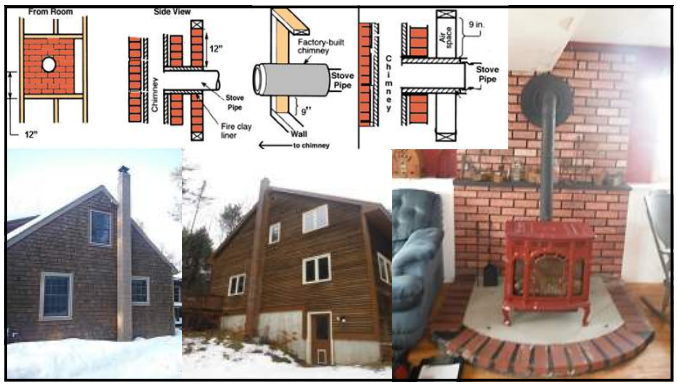
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From Room
Side View
12"
Factory-built chimney
Stove Pipe
Fire clay liner
9"
Wall
to chimney
Chimney
9 in.
Air space
Stove Pipe

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STANDARD OF CARE OF THE CHIMNEY SERVICE INDUSTRY

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STANDARD OF CARE OF THE HOME INSPECTION INDUSTRY

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CODES & STANDARDS

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TOOLS FOR NSPECTORS TO USE

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CHIMNEY INSPECTION TOOLS

TAPE MEASURE
FLASHLIGHT
MIRROR
ABILITY TO SEE COLORS
CHECKLIST OF ITEMS
KNOWLEDGE OF STANDARD OF CARE
CAMARA
FORMS OR SOFTWARE REPORTING

BOROSCOPE / ENDOSCOPE
INTERIOR VIDEO INSPECTION CAMERA SYSTEM
INFRARED CAMERA
PRESSURE GAUGE / PASCALS
LASER THERMOMETER





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SYSTEMS & PROCESSES

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DOCUMENTATION & REPORTING SYSTEMS

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READILY ACCESSIBLE

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ACCESSIBLE

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CONCEALED

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LAST CLEAR CHANCE

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PASSING THE BURDEN TO ACT

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PROPER NOTIFICATION TO THE CUSTOMER / CLIENT 3RD PARTIES

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Thanks For Attending The Presentation

Jerry Isenhour



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