

**PREHEAT
AND INTERPASS TEMPERATURES**
FOR ASTM A709 GRADE 36, 50, 50W STRUCTURAL STEEL
IN ACCORDANCE WITH AASHTO/AWS D1.5-2010

THICKNESS OF THICKEST PART AT POINT OF WELDING	MINIMUM PREHEAT/INTERPASS AT POINT OF WELDING
to 3/4" inclusive	50°F
over 3/4" to 1-1/2"	70°F
over 1-1/2" to 2-1/2"	150°F
over 2-1/2"	225°F

MAXIMUM PREHEAT TEMPERATURE 450°F
MAXIMUM INTERPASS TEMPERATURE 550°F

WELDING PROCEDURE FOR AWS PREQUALIFIED JOINTS
W71X-2

MATERIAL SPECIFICATION: ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS: SUBMERGED ARC WELDING
SEMI-AUTOMATIC OR MACHINE: SEMIAUTOMATIC OR MACHINE
POSITION OF WELDING: TO FLAT
FILLER METAL SPECIFICATION: AWS A5.23
CLASSIFICATION: F702-EM2K-N1-HB
MANUFACTURER/PRODUCT: LINCOLN LA-75/900
WIRE DIAMETER: 5/32"
SINGLE OR MULTIPLE ARC: SINGLE ARC
CURRENT/POLARITY: DEEP
ROOT TREATMENT: REMOVE ALL SCALE, RUST & CONTAMINANTS AND GRIND TO SOUND METAL.
PREHEAT TEMPERATURE: SEE PREHEAT CHART
ELECTRICAL STICK-OUT: 1-INCH

REVISIONS: 7/14/14
ORIGINAL ISSUE: 3/18/03

PASS NO.	AMPS	WIRE FEED SPEED/IN	VOLTS	TRAVEL SPEED/IN	CURRENT	POLARITY	JOINT DETAIL
ALL	400-550	60-120"	29-41	14-22"	DCEP		

USED FOR WEB AND FLANGE SPLICING

BACKEDGE AND GRIND TO SOUND METAL. MAY BE USED FOR APPROVED REPAIR WELDS.

THICKNESS RANGE: 1/2" TO 1 1/2" (12.5 TO 38.1 mm)

WELDING PROCEDURE FOR AWS NON-STANDARD JOINTS
NS-1X

PROCEDURE SPECIFICATIONS
MATERIAL SPECIFICATION: ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS: SUBMERGED ARC WELDING
MANUAL OR MACHINE: MACHINE
POSITION OF WELDING: TO FLAT
FILLER METAL SPECIFICATION: AWS A5.23
WELD METAL CLASSIFICATION: F702-EM2K-N1-HB
WIRE DIAMETER: 5/32"
SINGLE OR MULTIPLE ARC: SINGLE ARC
CURRENT/POLARITY: DEEP
ROOT TREATMENT: GRIND TO SOUND METAL, REMOVE ALL SCALE AND CONTAMINANTS.
PREHEAT AND INTERPASS TEMPERATURE: SEE PREHEAT CHART
ELECTRICAL STICK-OUT: 1-INCH

REVISIONS: 2/28/12
ORIGINAL ISSUE: 6/3/09

PASS NO.	AMPS	WIRE FEED SPEED	VOLTS	TRAVEL SPEED	NONSTANDARD JOINT
10A1	720-760	N/A	31-34	18-23	NONSTANDARD JOINT NS-08-B1
20B1	750-790	N/A	31-34.5	18-23	USED FOR 1/2" THICKNESS
10A1	720-760	N/A	31-34	18-23	USED FOR 5/16" THICKNESS
20B1	820-850	N/A	31-34	28-33	USED FOR 5/8" THICKNESS

USED FOR WEB SPLICING

REQUIREMENTS:
- NO BACKCUTTING REQUIRED.
- MAXIMUM ROOT OPENING OR AS FIT UP SHALL BE 1/8".

QUALIFIED IN ACCORDANCE WITH S13.2 PROCEDURE QUALIFICATION RECORD: MS-WP-12-16, NS-WP-12-17, EXP. 12/28/12

WELDING PROCEDURE FOR AWS PREQUALIFIED JOINTS
W53

MATERIAL SPECIFICATION: ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS: SUBMERGED ARC WELDING
SEMI-AUTOMATIC OR MACHINE: SEMIAUTOMATIC OR MACHINE
POSITION OF WELDING: 2F (HORIZONTAL)
FILLER METAL SPECIFICATION: AWS A5.17
CLASSIFICATION: F702-EM2K-N1-HB
MANUFACTURER/PRODUCT: LINCOLN LA-75/900
WIRE DIAMETER: 5/64" AND 3/32"
SINGLE OR MULTIPLE ARC: SINGLE ARC
CURRENT/POLARITY: DEEP/DCEN
ROOT TREATMENT: REMOVE LOOSE/THICK SCALE, RUST & CONTAMINANTS.
PREHEAT TEMPERATURE: SEE PREHEAT CHART
ELECTRICAL STICK-OUT: 1-INCH

REVISIONS: 7/26/14
ORIGINAL ISSUE: 1/1/92

PASS NO.	AMPS	WIRE FEED SPEED/IN	VOLTS	TRAVEL SPEED/IN	WIRE DIAMETER	CURRENT	POLARITY	TYPICAL JOINT DETAILS
1	487-500	128-182"	31-35.5	11-13"	5/64"	DCEP		
1	487-500	81-187"	31-35.5	11-13"	3/32"	DCEN		
1	487-500	132-178"	31-35.5	11-13"	3/32"	DCEN		

USED FOR CROSSFRAMES, DIAPHRAGMS, CONNECTION PLATES ON GIRDERS, AND MISC. DETAILS

SINGLE-PASS FILLET WELDS UP TO 5/16"

QUALIFIED IN ACCORDANCE WITH S13.2 EXP. 10/23/17
FWS: T-13-01, T-13-04, DCEN FOR AWS-13-02, DCEP FOR AWS-13-01

WELDING PROCEDURE FOR AWS PREQUALIFIED JOINTS
W71X-2 DC532

MATERIAL SPECIFICATION: ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS: SUBMERGED ARC WELDING
SEMI-AUTOMATIC OR MACHINE: MACHINE
POSITION OF WELDING: TO FLAT
FILLER METAL SPECIFICATION: AWS A5.23
CLASSIFICATION: F702-EM2K-N1-HB
MANUFACTURER/PRODUCT: LINCOLN LA-75/900
WIRE DIAMETER: 5/32"
SINGLE OR MULTIPLE ARC: SINGLE ARC
CURRENT/POLARITY: DEEP
ROOT TREATMENT: REMOVE ALL SCALE, RUST & CONTAMINANTS AND GRIND TO SOUND METAL.
PREHEAT TEMPERATURE: SEE PREHEAT CHART
ELECTRICAL STICK-OUT: 1-1/4"

REVISIONS: 11/8/14
ORIGINAL ISSUE: 3/18/03

PASS NO.	AMPS	WIRE FEED SPEED/IN	VOLTS	TRAVEL SPEED/IN	CURRENT	POLARITY	JOINT DETAIL
ALL	500-600	N/A	29.5-40	14-20"	DCEP		
4+	500-750	N/A	29.5-40	14-20"	DCEN		

USED FOR WEB AND FLANGE SPLICING

BACKEDGE AND GRIND TO SOUND METAL. MAY BE USED FOR APPROVED REPAIR WELDS.

THICKNESS RANGE: 1/2" TO 1 1/2" (12.5 TO 38.1 mm)

WELDING PROCEDURE FOR AWS PREQUALIFIED JOINTS
W71X-2 AC532-TANDEM

MATERIAL SPECIFICATION: ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS: SUBMERGED ARC WELDING
SEMI-AUTOMATIC OR MACHINE: MACHINE
POSITION OF WELDING: TO FLAT
FILLER METAL SPECIFICATION: AWS A5.23
CLASSIFICATION: F702-EM2K-N1-HB
MANUFACTURER/PRODUCT: LINCOLN LA-75/900
WIRE DIAMETER: 5/32"
SINGLE OR MULTIPLE ARC: MULTIPLE ARC
CURRENT/POLARITY: AC
ROOT TREATMENT: REMOVE ALL SCALE, RUST & CONTAMINANTS AND GRIND TO SOUND METAL.
PREHEAT TEMPERATURE: SEE PREHEAT CHART
ELECTRICAL STICK-OUT: 1-1/4"

REVISIONS: 8/11/14
ORIGINAL ISSUE: 8/03/10

PASS NO.	ELECTRODE	AMPS	WIRE FEED SPEED/IN	VOLTS	TRAVEL SPEED/IN	WIRE DIAMETER	CURRENT	JOINT DETAILS
1-4+	LEAD	425-500	36-57"	29-36	10-22"	33.8-91	AC	SINGLE-WIRE/ARC
4+	LEAD	425-500	36-81"	29-36	10-22"	33.8-181.3	AC	SINGLE-WIRE/ARC
OPTION	TRAIL	684-635	66-71"	32.1	23-26"	74.84-97.55	AC	MULTIPLE-WIRE TANDEM-ARC (OPTIONAL)

USED FOR WEB AND FLANGE SPLICING

BACKEDGE AND GRIND TO SOUND METAL. INTERMEDIATE 1000 AMP POWER SOURCES SHALL BE USED FOR EACH ELECTRODE WITH LEAD SET TO 80-94 AND TRAIL SET TO 34-66. 80° LEAD TO WORK ANGLE, 18° TRAIL PUSH ANGLE. TANDEM ARC SPACING IS 3/4" LONGITUDINAL AND 8" LATERAL.

THICKNESS RANGE: 1/2" TO 1 1/2" (12.5 TO 38.1 mm)

WELDING PROCEDURE FOR AWS PREQUALIFIED JOINTS
ROBO-1

MATERIAL SPECIFICATION: ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS: PULSED GAS METAL ARC WELDING
MANUAL OR MACHINE: MACHINE
POSITION OF WELDING: 2F (HORIZONTAL)
FILLER METAL SPECIFICATION: AWS A5.18
WELD METAL CLASSIFICATION: ER70S-6
WIRE/FILUX: LINCOLN SUPERARC L-56
WIRE DIAMETER: .0625"
SINGLE OR MULTIPLE ARC: SINGLE ARC
POLARITY: AC
ROOT TREATMENT: REMOVE SCALE, RUST AND CONTAMINANTS.
PREHEAT TEMPERATURE: SEE PREHEAT CHART
ELECTRICAL STICK-OUT: 3/4"
WELDING GAS: 90% AR / 10% CO2
GAS FLOW: 32-40 CFH

REVISIONS: 11/03/14
ORIGINAL ISSUE: 3/1/12

PASS NO.	AMPS	WIRE FEED SPEED/IN	VOLTS	TRAVEL SPEED/IN	TYPICAL JOINT DETAILS
1	242-273	300-300"	26-27	18.125-11	

USED FOR CROSSFRAMES

SINGLE-PASS FILLET WELDS UP TO 5/16"

PARAMETERS SHALL BE LOCKED VIA MILLER ACCESS FILE MANAGEMENT.

QUALIFIED IN ACCORDANCE WITH S13.2
FWS: T-12-01A, FOR AWS-11-04 EXP. 8/12/22/18

WELDING PROCEDURE FOR AWS PREQUALIFIED JOINTS
W71X-2 AC532-TANDEM

MATERIAL SPECIFICATION: ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS: SUBMERGED ARC WELDING
SEMI-AUTOMATIC OR MACHINE: MACHINE
POSITION OF WELDING: TO FLAT
FILLER METAL SPECIFICATION: AWS A5.23
CLASSIFICATION: F702-EM2K-N1-HB
MANUFACTURER/PRODUCT: LINCOLN LA-75/900
WIRE DIAMETER: 5/32"
SINGLE OR MULTIPLE ARC: MULTIPLE ARC
CURRENT/POLARITY: AC
ROOT TREATMENT: REMOVE ALL SCALE, RUST & CONTAMINANTS AND GRIND TO SOUND METAL.
PREHEAT TEMPERATURE: SEE PREHEAT CHART
ELECTRICAL STICK-OUT: 1-1/4"

REVISIONS: 8/11/14
ORIGINAL ISSUE: 8/03/10

PASS NO.	ELECTRODE	AMPS	WIRE FEED SPEED/IN	VOLTS	TRAVEL SPEED/IN	WIRE DIAMETER	CURRENT	JOINT DETAILS
1-4+	LEAD	425-500	36-57"	29-36	10-22"	33.8-91	AC	SINGLE-WIRE/ARC
4+	LEAD	425-500	36-81"	29-36	10-22"	33.8-181.3	AC	SINGLE-WIRE/ARC
OPTION	TRAIL	684-635	66-71"	32.1	23-26"	74.84-97.55	AC	MULTIPLE-WIRE TANDEM-ARC (OPTIONAL)

USED FOR WEB AND FLANGE SPLICING

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THICKNESS RANGE: 1/2" TO 1 1/2" (12.5 TO 38.1 mm)

**Vermont Agency of Transportation
RECEIVED**
CK'D BY J. CLARK OK'D BY D. PETERSON
December 10, 2014
RESUBMIT NO Approved
BY C. CARLSON DATE 12/17/2014

WELDING PROCEDURE QUESTIONS MAY BE REFERRED TO:
PAUL MUFFULETTO, HIGH STEEL STRUCTURES LLC
PMUFFULETTO@HIGH.NET
PHONE: (717)390-4253

NO.	REVISION	BY	CHK'D	DATE

HIGH STEEL STRUCTURES
An ISO 9001:2008 Certified Company
An Affiliate of High Industries Inc.

WELDING PROCEDURES
VT RT 108 OVER LITTLE RIVER
VT RT 108 STA. 3+48.00 TO STA. 4+78.00
TOWN OF STOWE, LAMOLLE COUNTY, VERMONT

STATE OF VERMONT
AGENCY OF TRANSPORTATION

STATE CONT. OR REF. NO.: 0235 (11)
FED. AID PROJ. NO.:
GENERAL CONTRACTOR: CCS CONSTRUCTORS LLC
PROJ. MGR: KEN GLIDDEN

DRAWING MANAGER: DAVE PAINTER (IH)
PROJECT NUMBER: S-1140166A-1
DATE: 12/09/14
DRAWING NUMBER: WP2