

ENA 80-SS from EVRAZ North America is an alloy steel OCTG grade for use in critical sour service applications. ENA 80-SS is a seamless quench and tempered product that meets all the requirements of API 5CT casing while having the enhanced corrosion performance necessary to meet the requirements of:

- IRP Volume I: Critical Sour Drilling for critical sour wells in Canada
- NACE MR0175/ISO 15156 for use in Region 1, 2, or 3
- ERCB Directive 010

ENA 80-SS will be monogrammed as API 5CT L80.

GEOMETRY	Outside Diameter	Nominal Weight T&C	Wall Thickness
Imperial (USC)	7.0"	23.00 lb/ft	0.317"
	7.0"	26.00 lb/ft	0.362"
Metric (SI)	177.8 mm	34.23 kg/m	8.05 mm
	177.8 mm	38.69 kg/m	9.19 mm
Development work on other sizes is ongoing			

MANUFACTURING

STEELMAKING: Fine grain practice
Clean steel practice

PIPE: Seamless Pipe
Quench and tempered pipe to ensure a fully tempered martensitic structure

CHEMICAL COMPOSITION

Max Mass Fraction %	API 5CT	ENA 80-SS
C	0.43	0.32
Mn	1.9	1.20
Cr	----	1.30
Mo	----	0.65
Si	0.45	0.35
P	0.030	0.020
S	0.030	0.010
Ni	0.25	0.20
Cu	0.35	0.20
Al	----	0.040
V	----	0.050
Nb	----	0.040
Ti	----	0.040
B	----	0.0025
P+S	----	0.025 (0.030% if Cr+Mo>0.30%, 0.035% if Cr+Mo>0.6%)

Alloy additions of chromium, nickel, and molybdenum improve strength, toughness and corrosion performance.

INSPECTION AS PER API 5CT

plus the following:

- 100% volumetric EMI inspection including transverse, longitudinal and oblique N5 notches and 100% full length wall thickness measurement
- 100% volumetric UT inspection, including transverse, longitudinal and oblique N5 notches and 100% full length wall thickness measurement
- Casing shall be inspected to SR2
 - Pipe inspected for imperfections greater than 5% of the specified wall thickness. These imperfections shall be considered defects and shall be dispositioned as allowed by API 5CT
- Special End Area (SEA) inspection on every pipe
 - Conduct visual and MPI of both the internal and external surfaces of the pipe ends to detect the presence of transverse and longitudinal defects
 - Overlap the SEA inspection and automated pipe body inspection by a minimum of 50 mm (1.97")

MICROSTRUCTURE AND MECHANICAL PROPERTIES		API 5CT L80	ENA 80-SS
HARDENABILITY (% martensite, min)		90%	90%
PRIOR AUSTENITE (γ) GRAIN SIZE		----	7 or finer
TENSILE MPa (KSI)			
YS (0.5% EUL)		MPa KSI	552-655 80 - 95
UTS		MPa KSI	655 min 95 min
HARDNESS (HRC)			
Max Reading		----	22.0
Max Value		23.0	21.0
Max Variation		----	3.0
MIRCO HARDNESS (HV 500g)			
Max Value		----	248
LONGITUDINAL CHARPY IMPACT TOUGHNESS AT 0°C (32°F)			
Energy		J Ft-lb	27 - 47 20 - 35
Min % shear		75%	75%

CORROSION PERFORMANCE

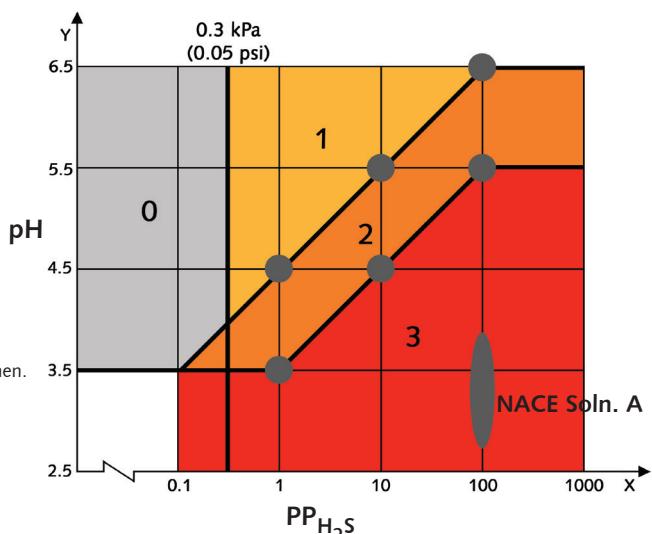
Meets NACE MR0175/ISO 15156 requirements for use in region 1, 2, or 3.

SULFIDE STRESS CORROSION CRACKING (SSC)	
API 5CT L80	ENA 80-SS
Method A ¹	90% SMYS
Method D ²	K _{1SSC} , ave = 33.0 MPa/m K _{1SSC} , specimen = 29.7 MPa/m
HYDROGEN INDUCED CRACKING (HIC) ³	
%CLR, max	10% max
%CLR, max	2% max

¹ Method A testing in Solution A with 100% H₂S performed per NACE TM0177.

² Method D testing in Solution A with 100% H₂S performed per NACE TM0177; based on a full size specimen.

³ HIC testing performed in Solution A and 100% H₂S performed per NACE TM0284.



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region 0
SSC region 1
SSC region 2
SSC region 3