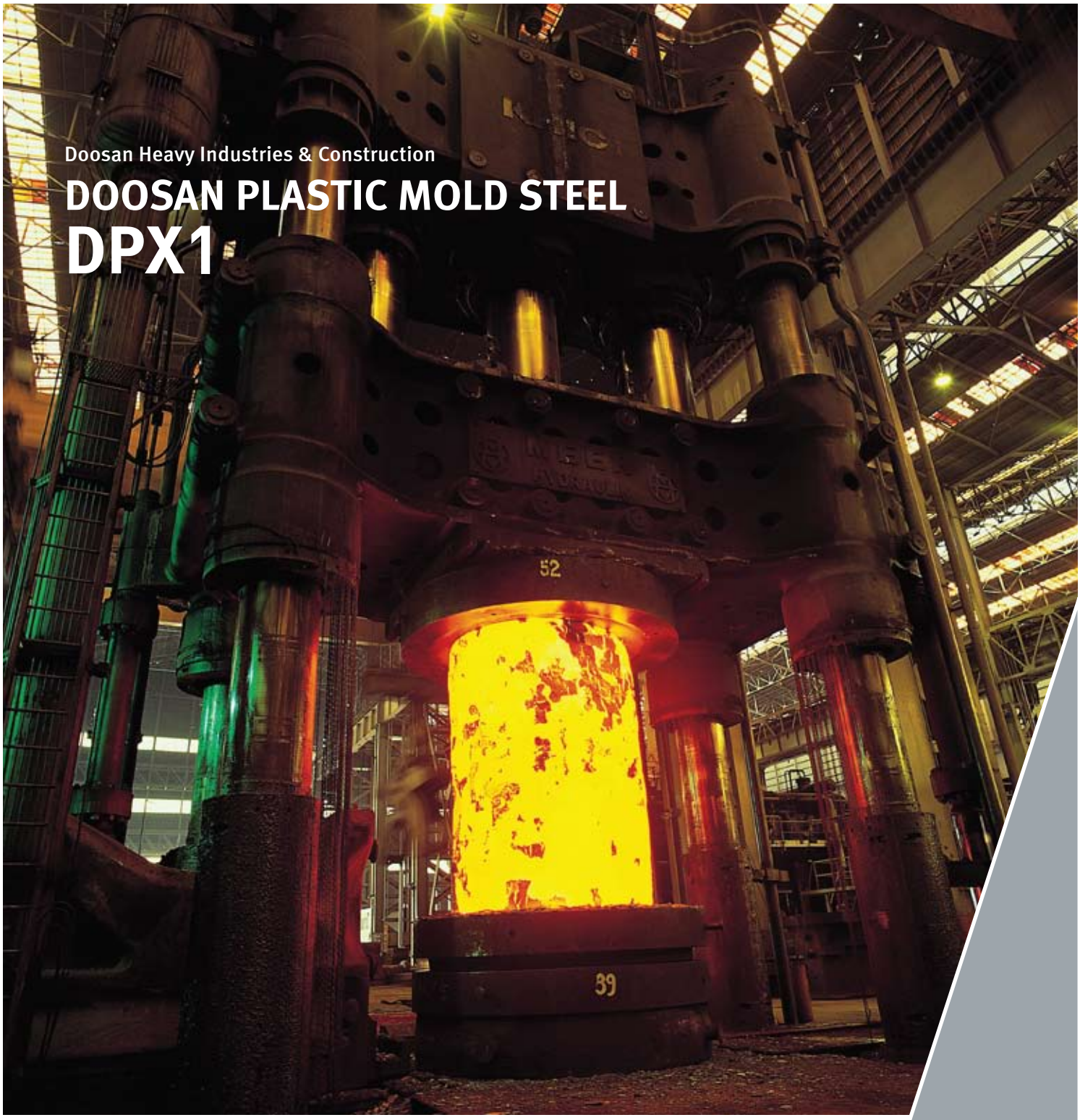


Doosan Heavy Industries & Construction

DOOSAN PLASTIC MOLD STEEL

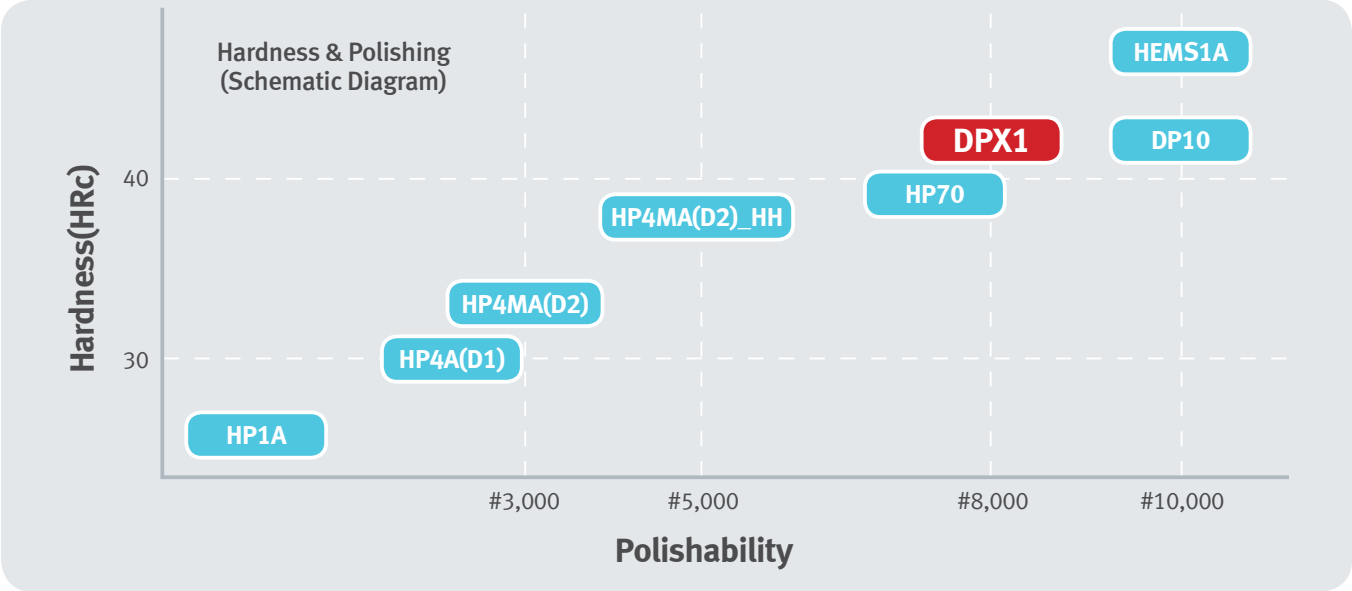
DPX1

DOOSAN

Building your tomorrow today

DPX1은 특수재용해법(Electro Slag Remelting)을 적용한 금형강으로 고경면, 고경도, 고강도 등을 요구하는 금형 외에 광범위하게 적용되는 금형용 소재이며, 프리하든 상태로 공급함

Doosan Brand	Reference Specification				납품조건
	DIN	AISI	JIS	ASSAB	
DPX1	1.2738 HH Improved	P20 HH Improved	SNCM Improved	718 Improved	ESR Process Prehardened (HRc 38~43)



특징 CHARACTERISTICS

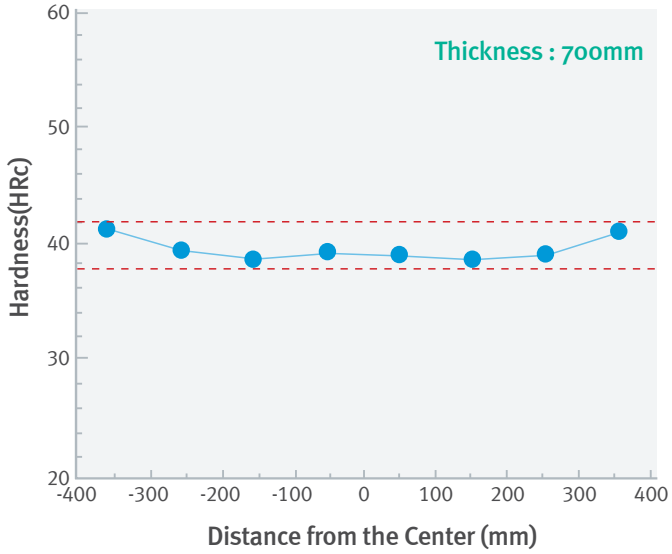
- 특수재용해(ESR) 적용으로 우수한 경면사상성(Excellent Polishability)
- 우수한 절삭가공성(Improved Machinability)
- 균일한 단면경도 확보(Uniform Hardness)
- 편석 현상 최소화로 우수한 부식가공성(Outstanding Photo Etching)
- 우수한 보수용접성(Good Weldability)

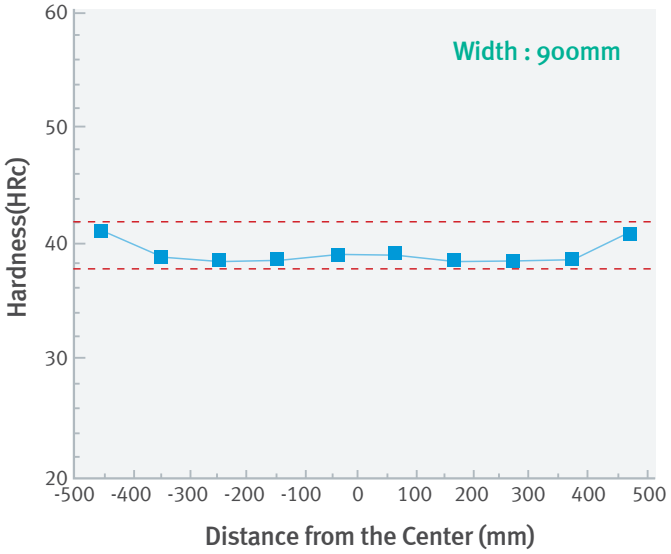
기계적 성질 MECHANICAL PROPERTIES

경도편차가 적고 균일하며, 기계적 성질이 우수함

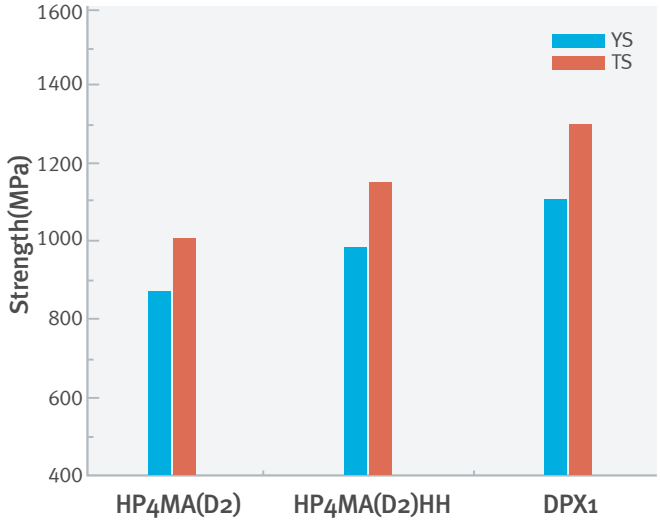
Surface Hardness(HRc)	Yield Strength(MPa)	Tensile Strength(MPa)
38~43	950~1,200	1,150~1,400

단면경도(Cross Sectional Hardness)

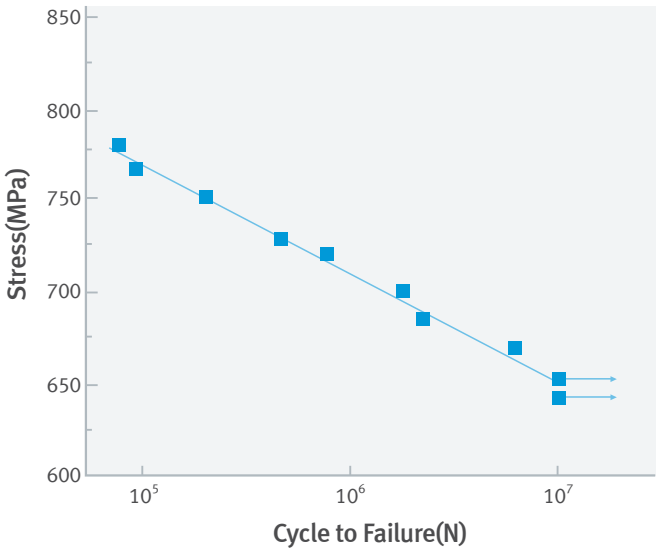




강도(Strength)



피로한도(Fatigue Limit)



편석 및 부식가공성 SEGREGATION & PHOTO ETCHING

◘ 특수재용해법(ESR) 적용으로 편석 조직이 거의 나타나지 않고 균일하여 우수한 부식가공성을 가짐

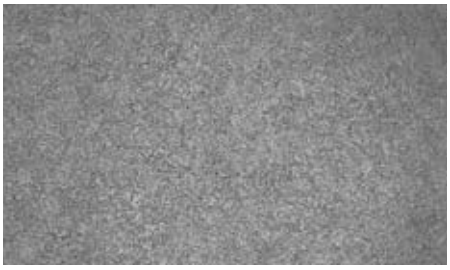
Macro Structure

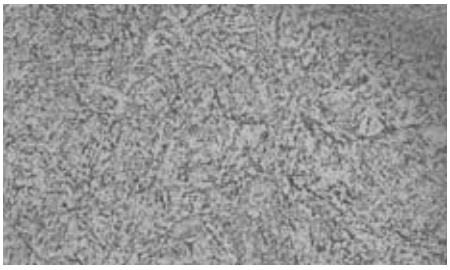
Photo Etching

균질한 미세조직 HOMOGENEOUS MICRO STRUCTURE

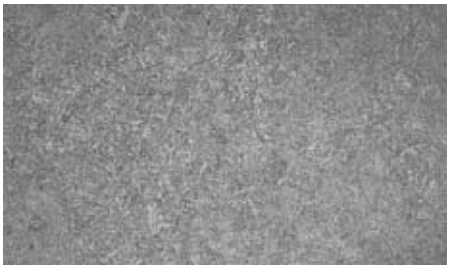
◘ 두께 부위별 조직의 차이가 없고 미세하고 균일함

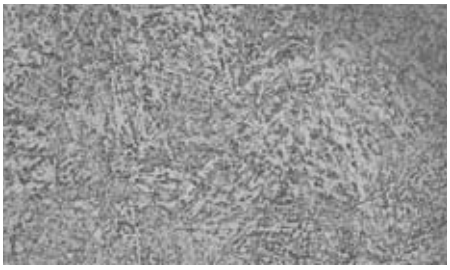
Quarter Position(¼ Thickness)





Center Position(½ Thickness)



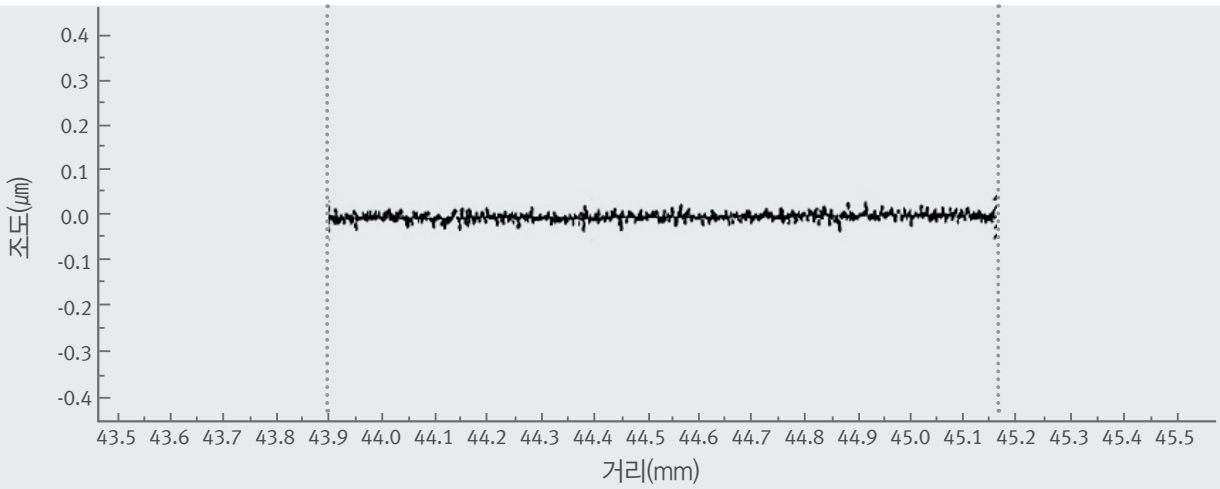


경면성 POLISHABILITY

◘ 표면조도(After 1㎛ Polishing)

(Unit : ㎛)

구 분	Ra	Rz	Rt
DPX1	0.0052	0.0417	0.0476

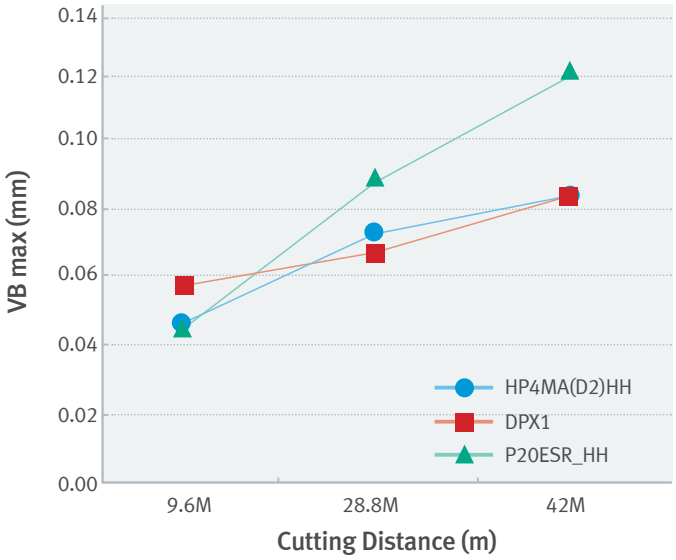


기계가공성 MACHINABILITY

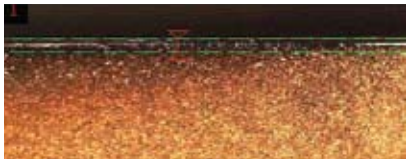
◘ 기계가공성이 우수하여 가공시간 및 공구소모량 절감됨

Test Condition(Tested by TaeguTec Member IMC Group)

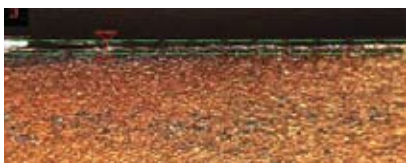
V (m/min)	F (mm/z)	Cutting Depth(mm)	Cutting fluid	Cutter / Insert
150	1	1.5	Dry	**Cutter** TFMBL 450-22R-13 **Insert** BLMP 1306R-M TT9080



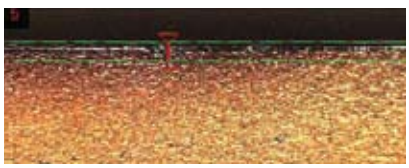
HP4MA(D2)-HH (42M 가공 후 / 마모량 : 0.084mm)



DPX1 (42M 가공 후 / 마모량 : 0.084mm)

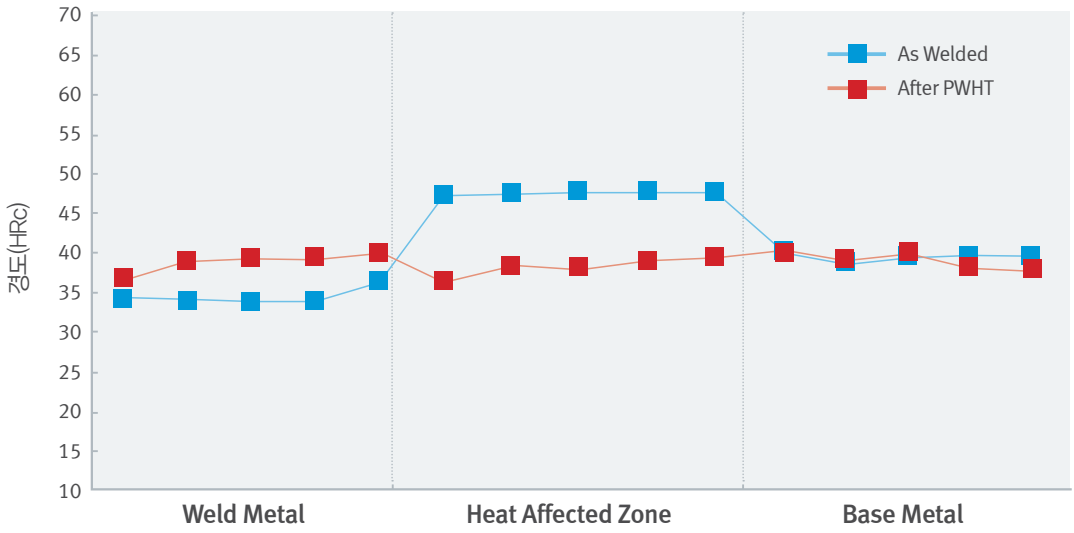


P20ESR-HH (42M 가공 후 / 마모량 : 0.120mm)

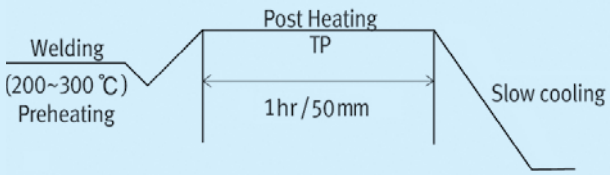
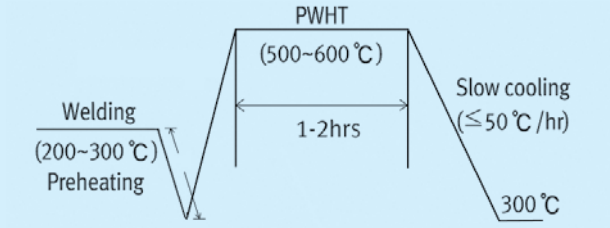


용접성 WELDABILITY

◘ 용접후열처리(PWHT) 후 용접부 경도편차가 적어 경면가공성 우수



◘ 용접조건(Procedure for Repair Welding)

구 분	보수 용접 방법	비 고
용접봉 (Filler Matals)	AWS, ER90S-B3	Welding Rod : ø1.6, ø2.4
예열 (Preheat Temperature)	250±50℃(200~300)	Fuel : LNG Fuel Pressure : 0.5kg/㎠
Post Heat Treatment (PHT)		TP(Holding Temperature) 320±50℃ 전류 : 170~180A, 전압 : 15~17V, Shielding Gas : Ar 10~16 L/min.
Post Weld Heat Treatment (PWHT)	 ★ Slow Coolded using Insulating Materials	Required Polishing and Etching Workability

물리적 성질 PHYSICAL PROPERTIES

구 분	온도 (℃)			
	100	200	300	400
열팽창계수 ($x10^{-6}$/℃)	12.25	12.46	12.87	13.14
열전도도 (W/m · K)	39.64	39.27	38.51	36.85
탄성계수(영율) (GPa at 21℃)	204			

생산공정 MANUFACTURING PROCESS

생산공정(Manufacturing Process)

1. Melting

2. V.S.D(Ingot Making by Vacuum Steam Degassing)

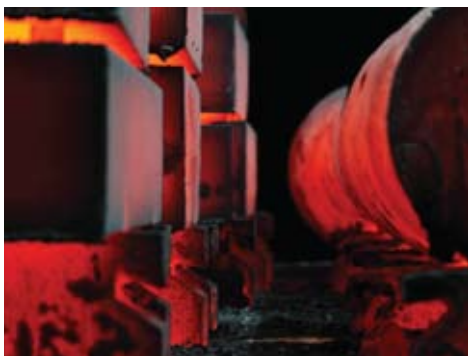
3. E.S.R

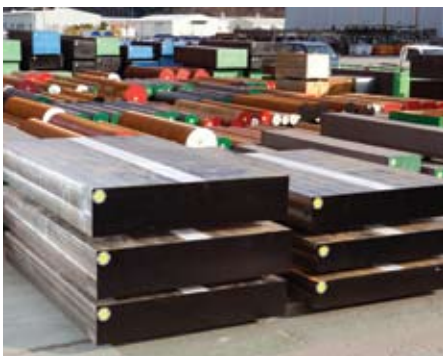
4. Heating

5. Forging

6. Heat treatment

7. Inspection





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