



# Hot Roll Ferrite-Bainite Steels

#### **Grade Availability**

	Bare	HDG
HR 540 FB	U	
HR 590 FB	U	U
HR 780 FB	U	U

**U** Unexposed, commercially available **I** In development

#### **Product Characteristics**

This family of hot roll steels includes products combining high tensile strength (UTS) with excellent formability and hole expansion (stretch flangeability) based on their largely ferrite-bainite microstructure.

The primary advantage of ferrite-bainite steels over HSLA and Dual Phase steels is the improved stretchability of sheared edges as measured by the hole expansion test. Compared to HSLA steels with the same level of tensile strength, ferrite-bainite steels generally also have a higher strain hardening exponent (n-value) and increased total elongation.

### **Applications**

These steels are suitable for cold drawing with edge stretch or hole expansion requirements.

Main applications are:

- Structural parts (longitudinal beams, cross members, chassis and suspension systems components)
- Wheels
- Mechanical parts (suspension system components, gear box components, etc.)



#### **Metallography**

HR 540 / 590 FB – approximately 85 percent ferrite and 15 percent bainite



HR 780 FB – predominantly bainite with finely dispersed martensite/austenite islands and small amounts of polygonal ferrite



# **Chemistry - Typical**

	с	Mn	Si	Other
HR 540 FB	0.085	1.25	0.65	
HR 590 FB Bare/HDG	0.065	1.5	0.30	Ti, Nb
HR 780 FB Bare	0.04	1.5	0.55	Cr, Nb, Ti
HR 780 FB HDG	0.05	1.5	0.20	Cr, Mo, Nb, Ti

## **Mechanical properties - Typical**

	Test Direction	Viold strongth (MP2)	Ultimate tensile strength	Total alongation	Holo ovpansion
lest - Direction		neiu strength (MFa)	(MPa)	Total elongation	
HR 540 FB	JIS-T	500	570	27 percent	80 percent min
HR 590 FB - Bare	JIS - T	545	620	25 percent	-
HR 590 FB - HDG	JIS - T	575	640	24 percent	75 percent min
ASTM-L HR 780 FB - Bare JIS - T	ASTM-L	690	815	16 percent	45 percent min
	JIS - T	760	840	16 percent	45 percent min
HR 780 FB - HDG	ASTM - L	740	800	17 percent	50 percent min
	JIS - T	780	820	17 percent	50 percent min

### **Size Availability**

#### HR 540 FB Bare



#### HR 590 FB Bare/HDG



HR780 FB Bare



#### HR780 HDG



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