

The Use of Foundry Pig Iron in Grey Iron Castings

- Pig iron is produced mainly by the smelting of iron ore in blast furnaces with coke or charcoal as reductant. It is a high Fe, low residual metallic material and should not be considered as a scrap substitute, but rather as a source of clean iron units that can be used to supplement and enhance the scrap charge. Many foundries prefer to use Pig Iron to blend with scrap and other feedstock materials due to its high Fe content, low gangue, low residual impurities and chemical purity.
- Foundry Pig Iron [also known as hematite pig iron] is differentiated from steelmaking Basic Pig Iron by its higher silicon content which is derived from the source raw materials and/or from ferro-alloy additions.
- Low residual impurities dilute undesirable elements such as chromium, vanadium, lead and titanium in the melt and offer the potential for use of a higher proportion of lower grade, lower cost scrap.

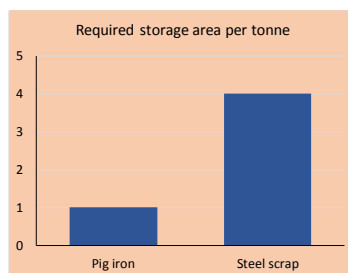
Foundry Pig iron Characteristics - % by weight					
Pig iron Type	C	Si	Mn	S	P
Basic	3.5 - 4.5	≤1.25	≤1.0	≤0.05	0.08-0.15
Foundry	2.8 - 4.2	1.0 - 4.0	0.5 - 1.2	≤0.04	≤0.12
HPPI	3.7 - 4.7	0.05 -1.5	≤0.05	≤0.025	≤0.035
Various tighter specifications are available from specific producers					
Ingot weight is typically 7.5-14 kg					
Ingot dimensions vary from producer to producer, examples being 17.5 x 13.5 x 16 cm and 20 x 15 x 5 cm.					

- Being manufactured from selected iron ore sources, Foundry Pig Iron has a consistent and predictable chemical and physical analysis which allows better control and variability of melting, tighter control of final casting composition and removes the requirement for costly heat treatment of castings.



Use of Foundry Pig Iron in Grey and Flake Iron castings

- Foundry Pig Iron is suitable for iron castings used in general engineering, machine tools and parts for the automotive industry. Due to the high proportion of iron ore used in the production of Foundry Pig Iron, the formation of pearlite in the finished casting is promoted. This effect is enhanced when more than 10% of Pig Iron per charge is used.
- The use of Foundry Pig Iron promotes graphite formation, reduces primary chill and improves machinability, particularly important in thin-walled castings
- The use of costly chill reducing inoculants can be minimised through increased additions of Foundry Pig Iron.
- The high density and high carbon content of Foundry Pig Iron improves melting rates or reduces energy consumption. In an electric induction furnace savings can be as high as 50 kWh/t of molten metal. In a cupola furnace savings of up to 50 kg coke/t of molten metal can be achieved.
- The higher bulk density of pig iron relative to scrap means lower storage space requirements, less handling during charge make-up, fewer charge buckets and lower charging time.



- The lower surface area : volume ratio relative to scrap means lower oxide (rust) formation and thus lower slag volume.
- The carbon content is chemically combined and thus goes into solution more quickly with lower energy requirement than when adding a recarburiser to scrap.

Typical Induction Furnace Charge Composition for Flake or Grey Iron Castings

	Grade		
	ENGJL-150	ENGJL-200	ENGJL-250
Foundry Pig Iron	25%	30%	25%
Foundry Returns	40%	35%	35%
Cast Iron Scrap	30%	20%	15%
Steel Scrap	5%	15%	25%

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