

Use of High Purity Pig Iron for Foundries Producing Ductile Iron Castings

High Purity Pig Iron (HPPI) is differentiated from other types of pig iron by its low manganese, phosphorus and sulphur contents. HPPI is manufactured from the smelting of ilmenite sand in electric furnaces to produce titanium dioxide slag and pig iron. Production facilities are located in South Africa, Canada, Norway and elsewhere. HPPI constitutes the principal ferrous feedstock material for production of ductile iron castings (also known as nodular or spheroidal graphite iron) used in high quality automotive, engineering and energy casting components.

High Purity 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	3.5 - 4.1	2.5 - 3.5	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					
Ingots typically weigh 7.5 to 12 kg					
Dimensions vary from producer to producer, e.g. 17.5 x 13.5 x 16 cm, 20 x 15 x 5 cm					

Aside from its low Mn, P and S contents, HPPI is also low in other undesirable impurity elements. Being manufactured from ilmenite mined on a large scale, HPPI has a consistent and predictable chemical and physical analysis.



The Benefits of Using HPPI in Ductile Iron Castings

Low content of residual impurities

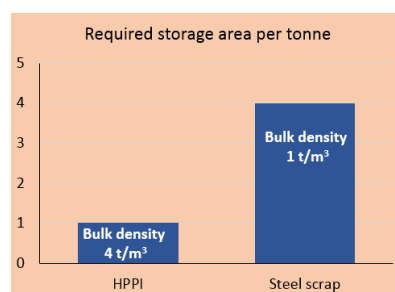
- dilutes undesirable elements in the melt
- offers potential for use of higher proportion lower grade, lower cost scrap

Consistent and predictable analysis

- allows better control and lower variability of melting
- tighter control of final casting composition = better mechanical properties of castings
- removes requirement for costly heat treatment of castings

Higher bulk density than steel scrap

- much lower storage space
- less handling during charge make-up
- fewer charge buckets required
- lower charging time



Lower surface area: volume ratio than scrap

- lower oxide (rust) formation = lower slag volumes

Carbon content is chemically combined

- goes into solution much more quickly with less energy required than when adding a recarburiser to scrap

Low Mn content and dilution effectiveness

- the required mechanical properties of most castings made with HPPI are achieved in the as-cast condition, thus eliminating costly heat treatment, a particularly attractive option for the production of castings with high impact resistance.

Higher electrical efficiency

- faster melting and reduced power consumption in induction furnaces

Increasing the percentage of pig iron in the charge normally leads to higher nodule counts in ductile iron castings

For all these reasons HPPI leads to significant net savings in casting costs.

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