e-iron™

r-iron™

The #1 Brand

- You can Trust.

Importance of Iron

Iron (from Latin word: ferrum) is an essential element for blood production. Iron performs many important functions in the body. It is primarily involved in the transfer of oxygen from the lungs to tissues. Iron is also part of myoglobin, a protein that carries and stores oxygen specifically in muscle tissues. Iron is important for healthy brain development and growth in children, and for the normal production and function of various cells and hormones. However, iron also plays a role in metabolism as a component of some proteins and enzymes. Iron is stored in the body as ferritin (in the liver, spleen, muscle tissue, and bone marrow).

serena® NUTRITION

www.serenanutrition.com

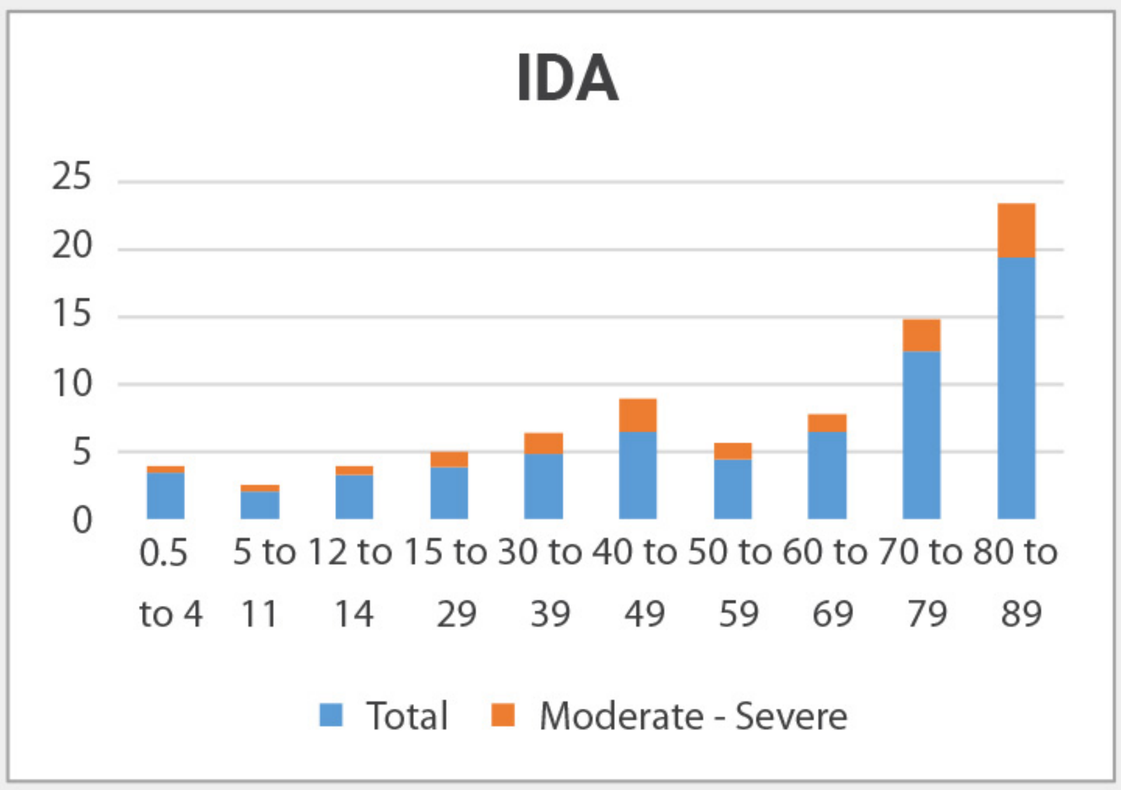
Types of Iron

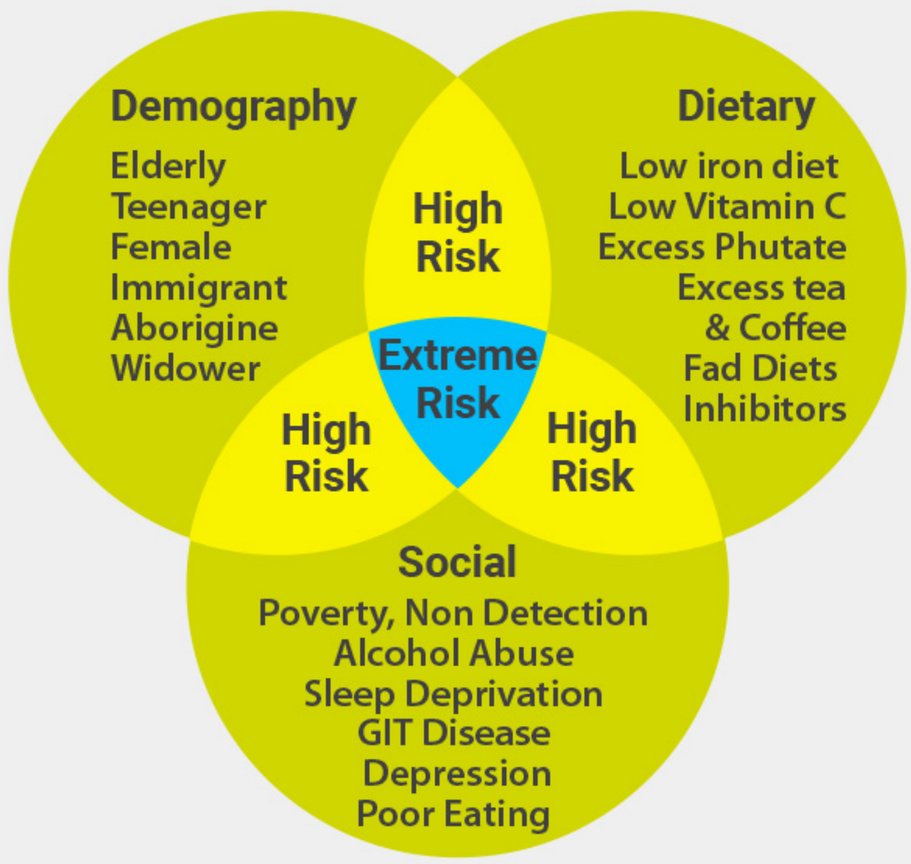
1) **Heme-Iron :** Heme iron is found only in animal flesh like meat, poultry, and seafood, iron fortified foods. Heme iron is better absorbed by the body than non-heme iron.

2) **Non-Heme Iron :** Non-heme iron is found in plant foods like whole grains, nuts, seeds, legumes, and leafy greens. Certain factors can improve or inhibit the absorption of non-heme iron. Vitamin C and heme iron taken at the same meal can improve the absorption of non-heme iron. Bran fiber, large amounts of calcium particularly from supplements, and plant substances like phytates and tannins can inhibit the absorption of non-heme iron.

Deficiency and Risk Factors

Iron deficiency is not only an issue for developing nations – it remains a persistent problem in many industrialized countries. Iron deficiency is seen most commonly in children, women who are menstruating or pregnant, and those eating a diet lacking in iron. Iron deficiency occurs in stages. The mild form begins with a decrease in stored iron, usually either from a low-iron diet or from excessive bleeding. If this does not resolve, the next stage is a greater depletion of iron stores and a drop in red blood cells. Eventually this leads to iron-deficiency anemia (IDA) where iron stores are used up and there is significant loss of total red blood cells. Typically, a screens for anemia by first checking a complete blood count (including hemoglobin, hematocrit, and other factors that measure red blood cell volume and size). If this is below normal, ferritin and transferrin levels may be measured to determine if the type of anemia is IDA.





Prevention of Iron Deficiency

When caused by inadequate iron intake, iron deficiency anemia can be prevented by eating a diet high in iron-rich foods with vitamin C or by intake of iron-fortified foods or iron supplements.

Elemental Iron for fortification

Elemental iron powder is the most pure form of powder with 99% iron content, which makes it suitable for numerous applications such as food fortification, pharmaceutical, nutraceutical and chemical products etc. the bioavailability of the different forms of elemental iron is very dependent on the size, shape and surface area of the iron particles. (characteristics which are governed by the manufacturing process), as well as the composition of the meals in which it is consumed.

Choice Of Elemental Iron

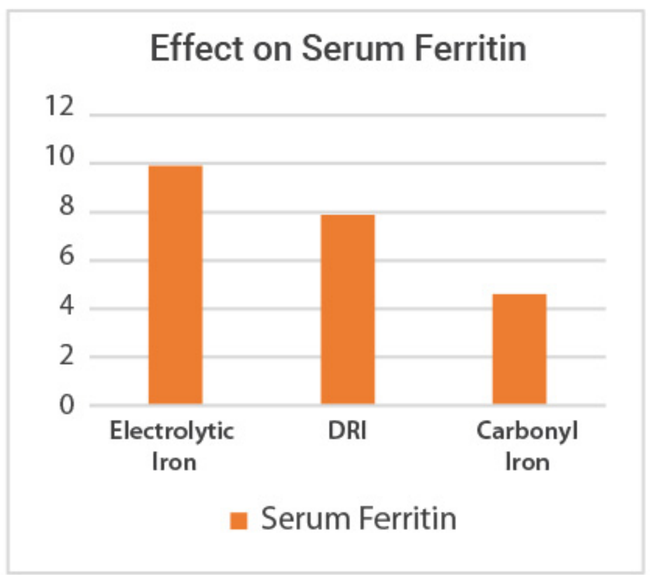
e-iron™ and **r-iron**™ are the product of Serena Nutrition Pvt. Ltd. derived by electrolysis process of extracting purest form of iron and by reduction process, which consists of negligible impurity or trace elements mainly heavy metals.

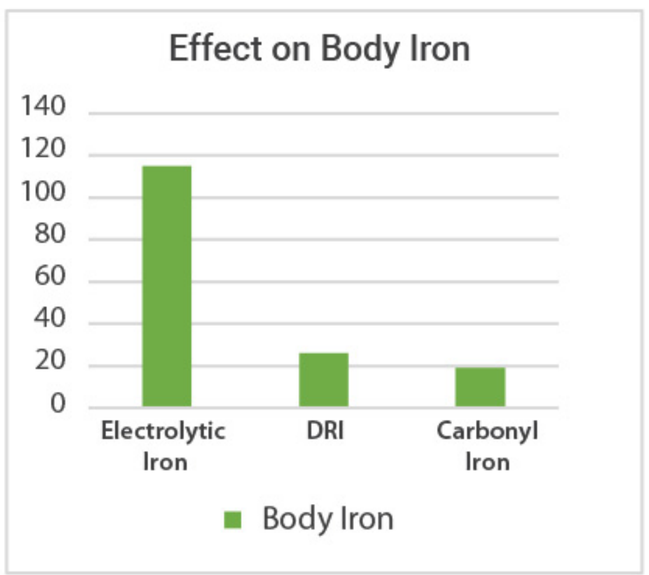
e-iron™ (Electrolytic Iron Powder)

High purity electrolytic iron powder produced by electrolysis with suitable composition and strength of the electrolyte, temperature, current density, very high purity iron is been deposited in a spongy or powdery state further it is mechanically pulverized into powder which is excellent in solubility and reactivity.

r-iron™ (Reduced Iron Powder)

Super high-purity iron powder produced by electolytic process followed by reduction in hydrogen atmosphere which helps in removal of residuals particularly carbon, nitrogen & oxygen and improves the appearance of the powder, which also helps in enhancing the self-life of the powder.





Prevention of Iron deficiency by Food Fortification

Food fortification also known as food enrichment, when nutrient are added to food as higher level than what the original food provide. Food fortification is one of the most effective, scalable, affordable and sustainable mean to address micronutrient malnutrition across population, countries and regions. It complements dietary diversification to help complete a person's daily nutritional needs. It fills the gap in nutrition in an easy manner without any change in taste, texture or flavor of food, minimizing the need for behavior change.

Iron in Food Fortification

The main source of iron are eggs, red meat, sea foods and whole grains. Poor intake of these food source, vegetarian diet or lack of food source availability causes IDA (iron deficiency anemia). Iron fortification of food is a methodology utilized worldwide to address iron deficiency and it helps to intake the daily required amount of iron to humans and considered the most cost-effective approach to prevent iron deficiency.

Why Elemental Iron Used In Food Fortification?

Iron is the most difficult mineral to add to foods. When added as water-soluble, highly bioavailable compounds such as ferrous sulfate, the soluble iron rapidly catalyzes fat oxidation resulting in rancid products. In addition, water-soluble iron compounds can cause unacceptable color reactions during storage and food preparation.

When selecting a suitable iron compound as a food fortificant, the overall objective is to find the one that has the greatest absorbability, shelf life, stability, prices, far less effect on sensory change etc. That is why we prefer elemental iron for food fortification.

Elemental iron powder has been proved to be the best option for food fortification and it have been traditionally used to fortify wheat and other cereal flours.

Recommended Iron compounds fortify for specific food vehicles

COMPOUNDS	TRADE NAME	FOOD VEHICLES
Electrolytic Iron	e-iron™	Low extraction (white) wheat flour or de-germed corn flour, Breakfast cereals, Infant formulas, Bouillon cubes, Cereal-based complementary food with ascorbic acid.
Electro-Reduced Iron	r-iron™	

Characteristic of Iron Compounds used for Food Fortification

Iron compound	Iron%	RBV	Vehicle in use	Relative cost per Mg iron
Water Soluble				
Ferrous sulfate 7H2O	20	100	1,3	1.2
Ferrous sulfate, dried	33	100	1,3	1.0
Ferrous gluconate	12	89	1,5	6.7
Ferrous lactate	19	67		7.5
Ferrous bisglycinate	20	>100		17.6
Ferric ammonium citrate	17	51	1,5	4.4
Sodium iron EDTA	13	>100	6,8	16.7
Ferrous fumarate	33	100	2	2.2
Ferrous succinate	33	92	2	9.7
Ferric saccharate	10	74	1,2	8.1
Encapsulated Form				
Ferrous fumarate	16	100	1	17.4
Ferrous sulfate	16	100	1	10.8
Almost Insoluble				
Ferric orthophosphate	29	25-74	2,7	4.0
Ferric pyrophosphate	25	21-74	2	4.7
Elemental Iron Powders				
Hydrogen-reduced iron	96	21-45	2,4	0.5
Carbonyl-reduced iron	97	5-20	2,4	2.2
e-iron™	99.5	71-86	2,4	0.8
r-iron™	99.7	75-93	2,4	1.0

Elemental Iron in Pharmaceutical and Chemical Uses

e-iron™ and **r-iron**™ are the most pure form of iron so it is used to producing iron supplements and helps to treat or prevent anemia (a lower than normal number of red blood cells) when the amount of iron taken in from the diet is not enough. Iron supplements come as regular, film-coated, and extended-release (long acting) tablets; capsules, and an oral liquid to take by mouth.

e-iron™ and **r-iron**™ is used for producing high purity ferrous salts for various applications and it is the most important of all metals.

Unique Selling Points

1. **Most Trusted Brand : e-iron**™ and **r-iron**™ has carved a unique place for iron in food fortification and dietary supplement industry.
2. **Best Food Vehicle : e-iron**™ and **r-iron**™ are the best vehicle for food fortification and good interaction with other vitamins and minerals.
3. **Do not cause organoleptic changes : e-iron**™ and **r-iron**™ are having less effect on organoleptic (sensory changes) like ferrous sulphate or any other ferrous salts.
4. **Excellent Bioavailability :** The Relatively bioavailability of **e-iron**™ and **r-iron**™ are in between 71 to 93%.
5. **Cheaper than other Soluble Compounds : e-iron**™ and **r-iron**™ are the purest form of iron it has excellent bioavailability in nature and it is cheaper than other iron compounds.
6. **Most Stability form of Iron : e-iron**™ and **r-iron**™ are stable under various method of cooking and different humidity. It has a greater shelf life up to 3 years.

The driving growth, demand of the **e-iron**™ and **r-iron**™ in the Food, Nutraceuticals and Pharmaceuticals industry is increasing. We offer precisely customized products with specific physical & chemical properties to suit a wide spectrum of industrial applications.

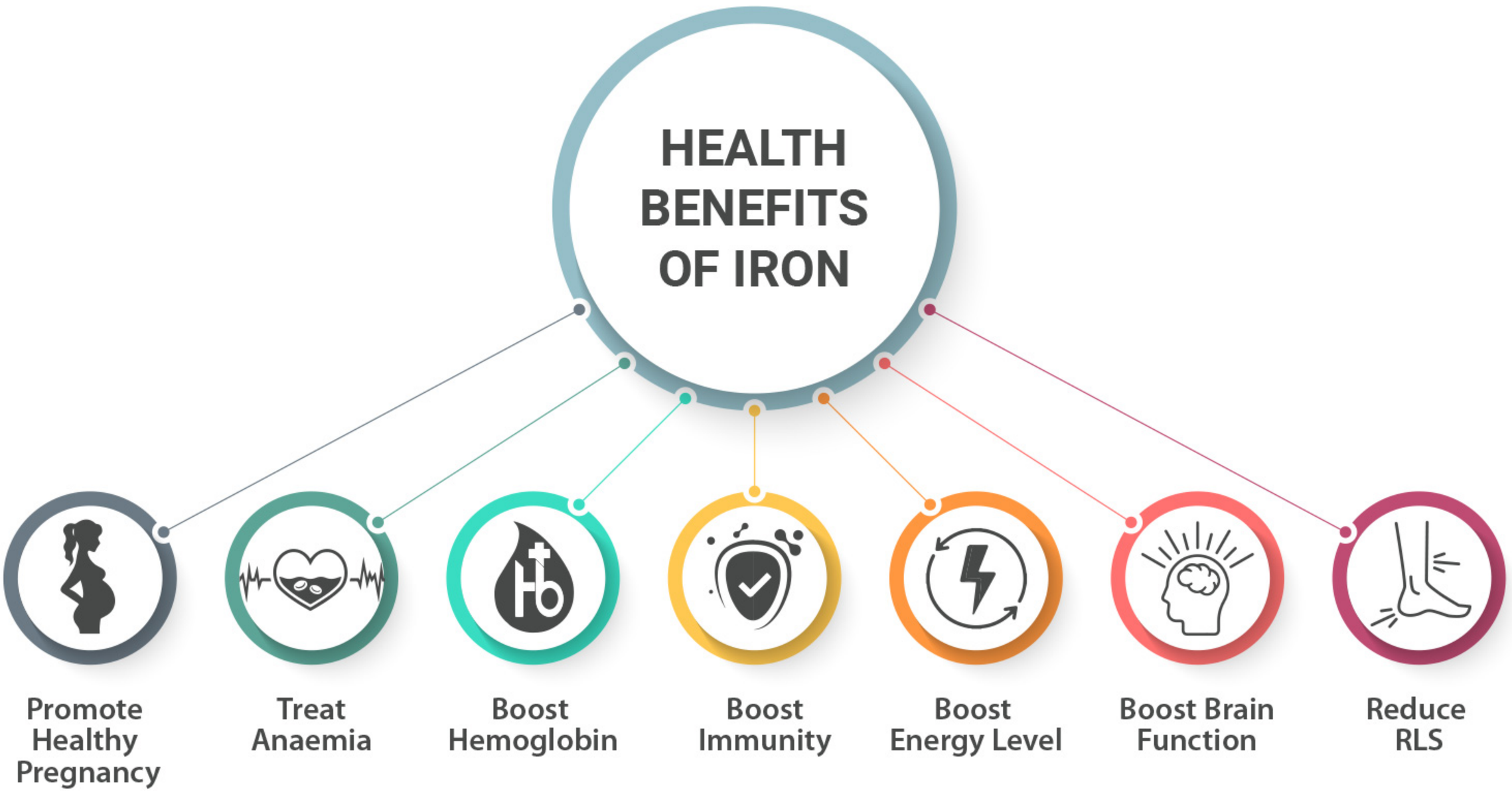
Our Product Offers

1) **Purity :** High purity with exceptionally low levels of residuals. Precise chemistry are available to meet your requirement.

2) **Quality :** From the selection of raw materials till dispatch of finished goods we undertake all the quality parameters.

3) **Consistency :** By using best raw materials, process control, and product homogeneity.

FORTIFY HEALTH



Brand Name		e-iron™	r-iron™
Products		Electrolytic Iron powder	Reduced Iron powder
Appearance		Grey - Black Powder	Lustrous Grey - Black Powder
Grade		E - SERIES	R - SERIES
CAS Number		7439-89-6	7439-89-6
Chemical Formula		Fe	Fe
Molecular Weight		55.85	55.85
Available Particle Size		100#, 200#, 325#	100#, 200#, 325#
Assay		99% (Min)	99.5% (Min)
Heavy Metals	Lead	< 1 PPM	< 1 PPM
	Arsenic	< 1 PPM	< 1 PPM
	Mercury	< 1 PPM	< 1 PPM
Acid Insoluble		0.02% (Max)	0.02% (Max)
Melting Point		1538°C	1538°C
Shelf life		3 years	3 years
Uses		Food fortification, Nutraceutical, Pharmaceutical, Dietary Supplement, Specialty Chemicals and Health Care Products.	
Storage		Stored in a clean, dry place at room temperature	
Standard Packing		25 Kgs Pouches in Carton Boxes, 40 Boxes per pallet - Stretch wrapped	
		50 Kgs in Drums, 20 Drums per pallet - Covered wooden Box	

Certifications

Serena Nutrition Pvt. Ltd.

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