

MIDREX® PLANTS

SINCE 1969, THERE HAVE BEEN NEARLY 100 MIDREX® SHAFT FURNACE DIRECT REDUCTION MODULES BUILT AROUND THE WORLD.

MIDREX® Plants are able to perform reliably at or above rated capacity in climates that range from the dry, sandy heat of Saudi Arabia to the frigid cold of Canada and Russia. To date only three MIDREX® Modules have ever been decommissioned, the two small demonstration plants commissioned in Portland, Oregon in 1969 and the first full sized commercial scale plant commissioned in Georgetown, South Carolina, USA in 1971. Much of the equipment from the Georgetown facility remains in operation at sister plants operated by the same owner. The following is a partial list of reference plants.*

Plant	Location	Design Capacity (Mt/y)	Shaft Furnace Modules	Product	Start-up
MIDREX® PROCESS					
Oregon Steel Mills 1 Pilot Plant ¹	Portland, Oregon, USA	0.08	1	CDRI	'69
Oregon Steel Mills 2 Pilot Plant ¹	Portland, Oregon, USA	0.08	1	CDRI	'69
ArcelorMittal Georgetown ²	South Carolina, USA	0.40	1	CDRI	'71
ArcelorMittal Hamburg	Hamburg, Germany	0.40	1	CDRI	'71
ArcelorMittal Canada 1	Contrecoeur, Quebec, Canada	0.40	1	CDRI	'73
TenarisSiderca	Campana, Argentina	0.40	1	CDRI	'76
ArcelorMittal Canada 2	Contrecoeur, Quebec, Canada	0.60	1	CDRI	'77
SIDOR I	Matanzas, Venezuela	0.35	1	CDRI	'77
Acindar	Villa Constitucion, Argentina	0.60	1	CDRI	'78
Qatar Steel I	Mesaieed, Qatar	0.40	1	CDRI	'78
SIDOR II	Matanzas, Venezuela	1.29	3	CDRI	'79
ArcelorMittal Point Lisas I & II	Point Lisas, Trinidad & Tobago	0.84	2	CDRI	'80/'82
Delta Steel	Warri, Nigeria	1.02	2	CDRI	'82
Hadeed A & B	Al-Jubail, Saudi Arabia	0.80	2	CDRI	'82/'83
OEMK I - IV	Stary Oskol, Russia	1.67	4	CDRI	'83/'85/'85/'87
Antara Steel Mills	Labuan Island, Malaysia	0.65	1	HBI	'84
EZDK I	El Dikheila, Egypt	0.72	1	CDRI	'86
LISCO 1 & 2	Misurata, Libya	1.10	2	CDRI	'89/'90
ArcelorMittal Nippon Steel India I	Hazira, India	0.44	2	CDRI	'90
ArcelorMittal Nippon Steel India II	Hazira, India	0.44	2	HBI/HDRI	'90
FMO	Puerto Ordaz, Venezuela	1.00	1	HBI	'90
VENPRECAR	Matanzas, Venezuela	0.82	1	HBI	'90
ArcelorMittal Nippon Steel India III	Hazira, India	0.44	1	HBI/HDRI	'92
Hadeed C	Al-Jubail, Saudi Arabia	0.65	1	CDRI	'92
JSW Dolvi Works	Raigad, India	1.00	1	CDRI	'94
EZDK II	El Dikheila, Egypt	0.80	1	CDRI	'97
LISCO 3	Misurata, Libya	0.65	1	HBI	'97
ArcelorMittal Lázaro Cárdenas ³	Lázaro Cárdenas, Mexico	1.20	1	CDRI	'97
COMSIGUA	Matanzas, Venezuela	1.00	1	HBI	'98
ArcelorMittal Point Lisas III	Point Lisas, Trinidad & Tobago	1.36	1	CDRI	'99
ArcelorMittal South Africa ⁴	Saldanha Bay, South Africa	0.80	1	CDRI	'99
EZDK III	El Dikheila, Egypt	0.80	1	CDRI	'00
ArcelorMittal Nippon Steel India IV	Hazira, India	1.00	1	HBI/HDRI	'04
Nu-Iron ⁵	Point Lisas, Trinidad & Tobago	1.60	1	CDRI	'06
ArcelorMittal Nippon Steel India V	Hazira, India	1.50	1	HBI/HDRI	'06
DRIC I & II ⁶	Dammam, Saudi Arabia	1.00	2	CDRI	'07
Hadeed E	Al-Jubail, Saudi Arabia	1.76	1	HDRI/CDRI	'07
LGOK HBI-2	Gubkin, Russia	1.40	1	HBI	'07
Qatar Steel 2	Mesaieed, Qatar	1.50	1	CDRI/HBI	'07
Lion DRI	Banting, Malaysia	1.54	1	HDRI/HBI	'08
ArcelorMittal Nippon Steel India VI	Hazira, India	1.50	1	CDRI	'10

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Plant	Location	Design Capacity (Mt/y)	Shaft Furnace Modules	Product	Start-up
MIDREX[®] PROCESS (Continued)					
Jindal Shadeed	Sohar, Oman	1.50	1	HDRI/HBI	'10
Tuwairqi Steel Mills	Karachi, Pakistan	1.28	1	HDRI/CDRI	'13
SULB	Hidd, Bahrain	1.50	1	HDRI/CDRI	'13
JSW Projects Ltd.	Toranagallu, Karnataka, India	1.20	1	HDRI/CDRI	'14
ESISCO	Sadat City, Egypt	1.76	1	HDRI/CDRI	'15
Jindal Steel & Power ⁷	Angul, India	1.80	1	HDRI/CDRI	'15
voestalpine Texas	Texas, USA	2.00	1	HBI	'16
LGOK HBI-3 ⁸	Gubkin, Russia	1.80	1	HBI	'17
Tosyali Algérie ⁹	Oran, Algeria	2.50	1	HDRI/CDRI	'18
Cleveland-Cliffs Toledo HBI	Toledo, Ohio	1.60	1	HBI	'20
Algerian Qatari Steel	Bellara, Algeria	2.50	1	HDRI/CDRI	'21
Mikhailovsky HBI ¹⁰	Zheleznogorsk, Russia	2.08	1	HBI	'24

FOOTNOTES

1. Original demonstration plants built for Oregon Steel Mills used to develop the MIDREX[®] Process. Ceased operating after the cost of natural gas to the plants rose to more than ten times the original cost.
2. Facility idled after its natural gas supply rose to eight times original cost. Parent company sold facility as it was about to restart; new owners relocated main process equipment to support their more strategically located MIDREX[®] Plants.
3. Record holder for most cumulative production from a single Direct Reduction module, producing more than 34 million tons to date.
4. 1st commercial COREX[®]/MXCOL[®] Plant
5. Original module first built in the 1990s in the USA as the 1.2 mtpy AIR plant. Idled due to low industry demand and record high natural gas prices in North America. It was moved to Trinidad & Tobago in 2005 and expanded by Midrex Technologies Inc. to a new design capacity of 1.6 mtpy.
6. Original modules first built in the 1970s in the UK and moved to USA in the late 1990s, then dismantled and moved again to Saudi Arabia in 2005-2006.
7. 1st commercial MXCOL[®] Plant using coal gasifier
8. Largest HBI Shaft Furnace Module in Production
9. Produced more than 2.23 million tons of direct reduced iron (DRI) in 2020, which is a world record for a single direct reduction module.
10. Project start-up is early 2024.

* There are additional MIDREX[®] Plants licensed by Kobe Steel, Ltd. of Japan

