

### REFERENCE LIST

**MOISTURE SEPARATOR REHEATERS - POWERSEPS - POWERVANES**

Item	Plant name	Reactor Size	Reactor Type	Country	Customer	Component	No. of Units	Reheater orientation	Moisture separator		Reheater			Shell Material	Job type	Com. Year
									Type	Material	Stage(s)	Heat. surf. [m <sup>2</sup> ]	Tube material			
83	Temelin 1	1030 MW	PWR	Czech Rep.	CEZ	MSR	2	horizontal	Powervane	X10CrNiTi189	1	6.376 per MSR	X3CrTi17 (439 L) (finned)	P355NH	Refurbishm.	2021
82	Temelin 2	1030 MW	PWR	Czech Rep.	CEZ	MSR	2	horizontal	Powervane	X10CrNiTi189	1	6.376 per MSR	X3CrTi17 (439 L) (finned)	P355NH	Refurbishm.	2020
81	Angra 3	1405 MW	PWR	Brasil	DELTA / ETN	Reheater	2 x 6	vertical	-	-	1	3.170 per MSR	St 35.8 III / P235GH (finned)	P355NH	New plant	2019
80	Angra 3	1405 MW	PWR	Brasil	DELTA / ETN	Moisture Separ. Internals	2 x 24	-	Powervane	X10CrNiTi189	-	-	-	P355NH	New plant	2019
79	Loviisa 2	520 MW	PWR	Finland	Fortum Power and Heat Oy	MSR	4	vertical	Powervane	X10CrNiTi188	2	2.070 / 1.680	X3CrTi17 (439 L) (finned)	P355NH	Refurbishm.	2016 / 2017
78	Loviisa 1	520 MW	PWR	Finland	Fortum Power and Heat Oy	MSR	4	vertical	Powervane	X10CrNiTi188	2	2.070 / 1.680	X3CrTi17 (439 L) (finned)	P355NH	Refurbishm.	2015
77	Dhursar	125 MW	Solar	India	Reliance	MSR	1	horizontal	Powervane	X10CrNiTi189	1	850 per MSR	X3CrTi17 (439 L) (finned)	SA-516 Gr. 70	New plant	2014
76	Angra 2	1300 MW	PWR	Brasil	ETN	Powersep	2	Extraction lines in front of HP heaters	Powersep	-	-	-	-	-	Refurbishm.	2014
75	Novovoronezh	1000 MW	VVER	Russia	Energoatom	Powersep	2	horizontal	Powersep	-	-	-	-	-	Upgrade	2013
74	Olkiluoto 3	1600 MW	EPR	Finland	Siemens PG	Powersep	2	horizontal	Powersep	-	-	-	-	-	New plant	2015
73	Olkiluoto 3	1600 MW	EPR	Finland	Siemens PG	MSR	2	vertical	Powervane	X10CrNiTi189	2	18.000 each	X3CrTi17 (439 L) (finned)	P355NH	New plant	2015
72	Oskarshamn 2	840 MW	BWR	Sweden	OKG Aktiebolag	MSR	2	horizontal	Powervane	X10CrNiTi189	2	2.320 / 4.400	X3CrTi17 (439 L) (finned)	P355NH	Upgrade	2013
71	Smolensk 1	1000 MW	RBMK	Russia	Energoatom	Moisture Separ. Internals	2 x 4	-	Powervane	X10CrNiTi189	-	-	-	-	Upgrade	2010
70	Leningrad 4	1000 MW	RBMK	Russia	Energoatom	Moisture Separ. Internals	2 x 4	-	Powervane	X10CrNiTi189	-	-	-	-	Upgrade	2009
69	Kursk 4	1000 MW	RBMK	Russia	Energoatom	Moisture Separ. Internals	2 x 4	-	Powervane	X10CrNiTi189	-	-	-	-	Upgrade	2009
68	Kursk 2	1000 MW	RBMK	Russia	Energoatom	Powersep	2 x 4	horizontal	Powersep	-	-	-	-	-	Upgrade	2009
67	Kalinin 2	1000 MW	VVER	Russia	Energoatom	Powersep	4	horizontal	Powersep	-	-	-	-	-	Upgrade	2009
66	Forsmark 2	1000 MW	BWR	Sweden	Forsmarks Kraftgrupp AB	MSR	4	horizontal	Powervane	X2CrNi18-9	2	2.850 each	X3CrTi17 (439 L) (finned)	P355NH	Upgrade	2009 / 2011
65	Forsmark 1	1000 MW	BWR	Sweden	Forsmarks Kraftgrupp AB	MSR	4	horizontal	Powervane	X2CrNi18-9	2	2.850 each	X3CrTi17 (439 L) (finned)	P355NH	Upgrade	2009 / 2011
64	Kursk 1	1000 MW	RBMK	Russia	Energoatom	Powersep	4	horizontal	Powersep	-	-	-	-	-	Upgrade	2008 / 2010
63	Kursk 3	1000 MW	RBMK	Russia	Energoatom	Powersep	2 x 4	horizontal	Powersep	-	-	-	-	-	Upgrade	2008
62	Kalinin 1	1000 MW	VVER	Russia	Energoatom	Powersep	4	horizontal	Powersep	-	-	-	-	-	Upgrade	2008
61	Leningrad 1	1000 MW	RBMK	Russia	Rosenergoatom	Moisture Separ. Internals	2 x 4	-	Powervane	X10CrNiTi189	-	-	-	-	Upgrade	2008
60	Leningrad 3	1000 MW	RBMK	Russia	Rosenergoatom	Moisture Separ. Internals	2 x 4	-	Powervane	X10CrNiTi189	-	-	-	-	Upgrade	2008
59	Balakovo 3	1000 MW	VVER	Russia	Energoatom	Powersep	4	vertical	-	-	-	-	-	-	Upgrade	2008
58	Leningrad 2	1000 MW	RBMK	Russia	Rosenergoatom	Moisture Separ. Internals	2 x 4	-	Powervane	X10CrNiTi189	-	-	-	-	Upgrade	2007 / 2011
57	Balakovo 2	1000 MW	VVER	Russia	Energoatom	Powersep	4	vertical	Powersep	-	-	-	-	-	Upgrade	2007
56	Balakovo 1	1000 MW	VVER	Russia	Energoatom	Powersep	4	vertical	Powersep	-	-	-	-	-	Upgrade	2007
55	Smolensk 2	1000 MW	RBMK	Russia	Rosenergoatom	Moisture Separ. Internals	2 x 4	-	Powervane	X10CrNiTi189	-	-	-	-	Upgrade	2007
54	Beznau 2	380 MW	PWR	Switzerland	NOK KKW Beznau	MSR	4	horizontal	Powervane	X10CrNiTi189	1	1.223 each	X3CrTi17 (439 L) (finned)	P355NH	Refurbishm.	2007
53	Forsmark 3	1200 MW	BWR	Sweden	Forsmarks Kraftgrupp AB	Reheater	2	vertical	-	-	1	6.960 each	Fin X3CrTi17 (439 L) (finned)	-	Upgrade	2007
52	Borssele	485 MW	PWR	Netherlands	Framatome-ANP	Moisture Separator	2	-	Powervane	X10CrNiTi189	-	-	-	-	Upgrade	2006
51	Tarapur 3	500 MW	PHWR	India	BHEL	Powersep	2	Extraction lines in front of HP heaters	Powersep	-	-	-	-	-	New plant	2006
50	Tarapur 4	500 MW	PHWR	India	BHEL	Powersep	2	Extraction lines in front of HP heaters	Powersep	-	-	-	-	-	New plant	2005
49	Tihange 1	1000 MW	PWR	Belgium	Electrabel	Reheater	2 x 4	vertical	-	-	2	3.720 each	X3CrTi17 (439 L) (finned)	-	Upgrade	2005
48	Gösgen	1000 MW	PWR	Switzerland	NPP Gösgen	Powersep	4	vertical	Powersep	-	-	-	-	-	Upgrade	2005
47	Gösgen	1000 MW	PWR	Switzerland	KKW Gösgen	Reheater	2	vertical	-	-	1	4.700 each	X3CrTi17 (439 L) (finned)	-	Upgrade	2005
46	Tarapur 4	500 MW	PHWR	India	BHEL	MSR	2	vertical	Impact	X10CrNiTi189	2	3.750 each	St 35.8 III (finned)	WSE355 / SA-516 Gr.70	New plant	2005 / 2006
45	Tarapur 3	500 MW	PHWR	India	BHEL	MSR	2	vertical	Impact	X10CrNiTi189	2	3.750 each	St 35.8 III (finned)	WSE355 / SA-516 Gr.70	New plant	2005 / 2006
44	Biblis B	1300 MW	PWR	Germany	RWE	MSR	2	vertical	Impact	X10CrNiTi189	1	2.180 each	10CrMo910	15MnNi 63	Refurbishm.	2003
43	GKN 2	1400 MW	PWR	Germany	NPP Neckarwestheim	Powersep	4	horizontal	Powersep	-	-	-	-	-	Upgrade	2002
42	Unterweser	1400 MW	PWR	Germany	NPP Unterweser	Powersep	4	Inclined piping	Powersep	-	-	-	-	-	Upgrade	2002
41	Angra 2	1300 MW	PWR	Brasil	Siemens KWU	MSR	2	vertical	Impact	X10CrNiTi189	1	3.200 each	St 35.8 III (finned)	WSE355	New plant	2001
40	Rajasthan 4	236 MW	PHWR	India	BHEL	MSR	2	horizontal	Impact	X10CrNiTi189	2	1.995 each	St 35.8 III (finned)	WSE355 / SA-516 Gr.70	New plant	2000
39	Rajasthan 3	236 MW	PHWR	India	BHEL	MSR	2	horizontal	Impact	X10CrNiTi189	2	1.995 each	St 35.8 III (finned)	WSE355 / SA-516 Gr.70	New plant	2000
38	Kaiga 2	236 MW	PHWR	India	BHEL	MSR	2	horizontal	Impact	X10CrNiTi189	2	1.995 each	St 35.8 III (finned)	WSE355 / SA-516 Gr.70	New plant	2000
37	Kaiga 1	236 MW	PHWR	India	BHEL	MSR	2	horizontal	Impact	X10CrNiTi189	2	1.995 each	St 35.8 III (finned)	WSE355 / SA-516 Gr.70	New plant	2000
36	Brokdorf	1400 MW	PWR	Germany	NPP Brokdorf	Powersep	4	horizontal	Powersep	-	-	-	-	-	Upgrade	2000
35	Stade	660 MW	PWR	Germany	NPP Stade	Powersep	4	vertical	Powersep	-	-	-	-	-	Upgrade	1999 *
34	Kalkar	300 MW	FBR	Germany	Siemens KWU	Moisture Separator	2	-	High-speed w. agglomer.	X10CrNiTi189 Hill	-	-	-	-	New plant	1991 *
33	Trillo I	900 MW	PWR	Spain	Siemens KWU	MSR	2	vertical	Impact	X10CrNiTi189	1	3.200 each	St 35.8 III (finned)	15MnNi 63	New plant	1988
32	Neckarwestheim 2 (Konvoi)	1400 MW	PWR	Germany	Siemens KWU	MSR	2	vertical	Powervane	X10CrNiTi189	1	6.600 each	St 35.8 III (finned)	WST 36	New plant	1987
31	Würgassen	670 MW	BWR	Germany	Siemens	LP Moisture Separator	2	-	Impact	X10CrNiTi189	-	-	-	-	Refurbishm.	1987 *
30	Brokdorf	1400 MW	PWR	Germany	Siemens KWU	MSR	2	vertical	Powervane	X10CrNiTi189	1	-	St 35.8 III (finned)	15MnNi 63	New plant	1986
29	Mülheim-Kärlich	1300 MW	PWR	Germany	Siemens KWU	Powersep	2	Shell	Powersep	-	-	-	-	-	New plant	1986 *
28	Mülheim-Kärlich	1300 MW	PWR	Germany	BBC	MSR	2	vertical	High-speed w. agglomer.	X10CrNiTi189 Hill	1	5.200 each	St 35.8 III (finned)	-	New plant	1986 *
27	Icar 2 (Konvoi)	1400 MW	PWR	Germany	Siemens KWU	MSR	2	vertical	Powervane	X10CrNiTi189	1	6.600 each	St 35.8 III (finned)	WST 36	New plant	1986
26	Ernstland (Konvoi)	1400 MW	PWR	Germany	Siemens KWU	MSR	2	vertical	Powervane	X10CrNiTi189	1	6.600 each	St 35.8 III (finned)	WST 36	New plant	1986
25	Grohnde	1300 MW	PWR	Germany	Siemens KWU	MSR	2	vertical	Impact	X10CrNiTi189	1	3.200 each	St 35.8 III (finned)	15MnNi 63	New plant	1985

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									Type	Material	Stage(s)	Heat. surf. [m <sup>2</sup> ]	Tube material			
24	Stade	662 MW	PWR	Germany	KKW Stade	Moisture Separator	2	-	Powervane	X10CrNiTi189	-	-	-	-	Refurbishm.	1985 *
23	Phillipsburg 2	1400 MW	PWR	Germany	Siemens KWU	MSR	2	vertical	Powervane	X10CrNiTi189	1	3.200 each	St 35.8 III (finned)	15MnNi 63	New plant	1984
22	Brunsbüttel	805 MW	BWR	Germany	KKW Brunsbüttel	Reheater	2	vertical	-	-	1	2.090 each	10CrMo910	-	Refurbishm.	1984
21	Gundremmingen C	1300 MW	BWR	Germany	Siemens KWU	MSR	2	vertical	Powervane	X10CrNiTi189	1	-	St 35.8 III (finned)	WSIE36	New plant	1984
20	Gundremmingen B	1300 MW	BWR	Germany	Siemens KWU	MSR	2	vertical	Powervane	X10CrNiTi189	1	-	St 35.8 III (finned)	WSIE36	New plant	1984
19	Würgassen	670 MW	BWR	Germany	Siemens	HP Moisture Separator	2	vertical	Multi-Cyclone	X10CrNiTi189	-	-	-	-	Refurbishm.	1984 *
18	Obrigheim	345 MW	PWR	Germany	KKW Obrigheim	MSR	2	vertical	Impact	X10CrNiTi189	1	1.000 each	10CrMo910 St 35.8 III	15MnNi 63	Refurbishm.	1983 *
17	Unterweser	1300 MW	PWR	Germany	KKW Unterweser	Reheater	2	vertical	-	-	1	2.736 each	10CrMo910	-	Refurbishm.	1982
16	Phillipsburg 1	890 MW	BWR	Germany	Siemens KWU	MSR	2	vertical	Impact	X10CrNiTi189	1	-	X3CrTi17 (439L)	17Mn4	New plant	1979
15	Gösgen	900 MW	PWR	Switzerland	Siemens KWU	MSR	2	vertical	Impact	X10CrNiTi189	1	3.650 each	X10CrNiTi189 St 35.8 III (finned)	19Mn6	New plant	1979
14	Unterweser	1300 MW	PWR	Germany	Siemens KWU	MSR	2	vertical	Impact	X10CrNiTi189	1	2.236 each	10CrMo910 St 35.8 III	17Mn4	New plant	1978
13	Donald Cook II	1094 MW	PWR	USA	BBC	MSR	2	horizontal	Wire mesh	X10CrNiTi189	1	5.772 each	St 35.8 III	-	New plant	1978
12	Tullnerfeld	692 MW	BWR	Austria	Siemens KWU	MSR	2	vertical	Impact	X10CrNiTi189	1	3.390 each	10CrMo910 St 35.8 III	17Mn4	New plant	1978 *
11	Isar 1	900 MW	BWR	Germany	Siemens KWU	MSR	2	vertical	Impact	X10CrNiTi189	1	-	10CrMo910 St 35.8 III	WSIE36	New plant	1977
10	Biblis B	1300 MW	PWR	Germany	Siemens KWU	MSR	2	vertical	Impact	X10CrNiTi189	1	-	St 35.8 III	17Mn4	New plant	1977
9	Brunsbüttel	805 MW	BWR	Germany	Siemens KWU	MSR	2	vertical	Impact	X5CrNiTi18	1	1.950 each	10CrMo910 St 35.8 III	15MnNi 63	New plant	1976
8	Neckarwestheim	854 MW	PWR	Germany	Siemens KWU	MSR	2	vertical	Impact	X10CrNiTi189	1	2 x 1730, 1 x 775	10CrMo910 St 35.8 III	17Mn4	New plant	1976
7	Biblis A	1150 MW	PWR	Germany	Siemens KWU	MSR	2	vertical	Impact	X10CrNiTi189	1	-	St 35.8 III	17Mn4	New plant	1974
6	Atucha	340 MW	PHWR	Argentina	Siemens KWU	Moisture Separator	2	-	Centrifugal	X5CrNi189	-	-	-	-	New plant	1974
5	Atucha	340 MW	PHWR	Argentina	Siemens KWU	Powersep	2	Inclined piping	Powersep	-	-	-	-	-	New plant	1973
4	Borselle (only engineering)	440 MW	PWR	Netherlands	Stork	Powersep	2	Shell	Powersep	-	-	-	-	-	New plant	1972
3	Stade	660 MW	PWR	Germany	Siemens KWU	Powersep	2	Shell	Powersep	-	-	-	-	-	New plant	1972 *
2	Stade	662 MW	PWR	Germany	Siemens KWU	MSR	2	vertical	Centrifugal	X5CrNi189	1	1.520 each	X20CrMoV121 St 35.8 III	-	New plant	1972 *
1	Obrigheim	345 MW	PWR	Germany	Siemens KWU	MSR	2	vertical	Centrifugal	X10CrNiTi189	1	1.000 each	10CrMo910 St 35.8 III	-	New plant	1969 *

\* suspended / shut down