

□ DOUBLE-LAYER AND TRIPLEX SHEETS AND PLATES



**OMZ-SPECIAL STEELS**



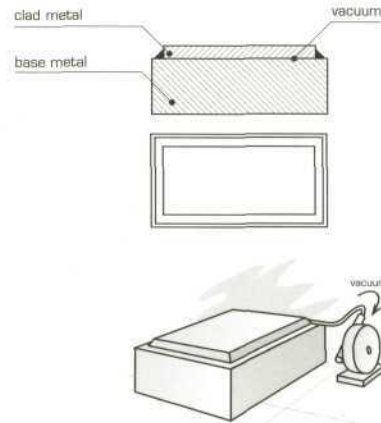
## OMZ – SPECIAL STEELS DOUBLE-LAYER AND TRIPLEX SHEETS AND PLATES

**OMZ – Special Steels** is a basic enterprise of OMZ Corporation involved in manufacturing of metallurgical products such as forged and formed blanks, hot-rolled sheets and plates, steel, iron, precision castings as well as semi-finished products of different purpose.

**the enterprise was formed in August of 2002** by segregation of metallurgical facilities of the largest engineering companies – Izhorskiye

Zavody (St. Petersburg) and Uralmash-zavod (Ekaterinburg) into a separate legal entity OMZ – Special Steels.

**metallurgical facilities** have half a century experience of manufacturing the large double-layer and triplex sheets and plates for critical articles. Specialists have developed and mastered the manufacturing method of clad metal sheets and plates (double-layer and triplex) by rolling of unsymmetrical packs.



## MECHANICAL PROPERTIES OF CLAD METAL SHEETS AND PLATES

steel grade		Technical Specification No. and GOST	size of sheets and plates, mm			strength category, N/mm <sup>2</sup>	mechanical properties, +20 °C		
base metal	clad metal		thickness	width	length		$\sigma_B$	$\sigma_{0.2}$	$\delta$
09Г2С	08Х18Н10Т	GOST 10885-85	8-50	1500-3000	4000-12 000	265-305	430-450	265-305	20
16ГС	12Х18Н10Т	TS 05764417-041-95	51-140	1500-4100	4000-10 500	265-305	430-450	265-305	20
СТ3	08Х13		8-50	1500-3000	4000-11 000		370-480	205-245	23-28
СТ20	08Х17Н15М3Т		51-160	1500-4100		370	410	370	28
12ХМ	10Х17Н13М2Т		10-160	1500-4100	4000-10 500	245	430	245	19
22К						215	480-650	280	20
SA387Gr11cl2			20-140	1500-3200	4000-10 500	310	515-690	310	22
SA387Gr22cl2			20-120			310	515-690	310	18
22К	08Х18Н10Т	0900-005-05764417-99	20-125	1500-4100	4000-10 500	215	430-620	215-500	20
09ХН3МД	08Х18Н10Т	05764417-048-96	20-50	1500-3200	4000-10 500	550-620	670-890	550-620	15-16
12ХН2МД		5.961-11680-98				500	610-770	500	18
F36(S)Z		0900-025-05764417-2001				355	490-620	355	21
F36(S)Z	317LN	0900-029-05764417-2002							20
09Г2С 20А	08Х18Н10Т	05764417-042-96	10-12	1500-2300	4000-12 000	355	490-620	355	20

DOUBLE-LAYER AND TRIPLEX SHEETS AND PLATES

MANUFACTURE; DELIVERY; QUALITY CONTROL



## AREAS OF APPLICATION

**Oil and Gas Complex, Chemical Industry:** vessels and pipelines for corrosive medium (including hydrosulfide medium), operating at normal and high temperature and pressure; vessels and pipelines, operating at low environmental temperature.

**Nuclear Power Engineering:** hydraulic accumulators of emergency core cooling system and other equipment.

**Floating Drilling Rigs:** ice sheathing of offshore platforms.

Our specialists have mastered production of clad sheets and plates of various steel grades:

**base metal:** Cr. 3cn (Gr36A570 ASTM), 20A (1020 AISI), 20K (1022 AISI), 22K (1022 AISI), 16ГC (St 52-3 DIN 17100), 09Г2C (Mn2Si), 12XM (A 387 Gr11 ASTM), 09H3MД (XNi3MoD), 12X2MД (XNi2MoD), 10X2M1, F36(S)Z, SA387Gr11, SA387Gr22.

**clad metal:** 08X18H10T (321 ASTM-240), 12X18H10T (321 ASTM-240), 08X13 (410S ASTM-240), 10X17H13M2T (316Ti ASTM-240), 08X17H15M3T, 317LN, 316.



Properties at test temperature, not less than			σ <sub>shear</sub>			Ultrasonic testing class of continuousness	application	note
KCU	KCU after mechanical aging	KCV	-40 °C	-60 °C	+550 °C			
J/cm <sup>2</sup>			N/mm <sup>2</sup>					
59	29		29	24 (-70 °C)		190	0, I, II	products of precessing engineering
59	29		29	24				
-	-	-	-	-	-			
-	-	34						
59	-	-	-	-	-			
			55	-	229 (+460 °C)			
-	29	29	-	-	-	190	0	products of nuclear power engineering
-	-	-	37	37	-	295	I	for units, constructed under supervision of Russian Maritime Register of Shipping, for ice sheathing of ice-resistant offshore platforms included
-	-	-	60	60	-	355	I	
-	-	-	40	24	-		0	
-	-	-	-	50	-	200	0	
-	-	-	60	37		190	I	for corrosion-resistant and cold-resistant pipes of oil and gas transportation and gathering systems

# CLAD METAL SHEETS AND PLATES

## clad metal sheets and plates:

Gr36 A570 ASTM+321 ASTM-240;  
Gr36A570 ASTM+410S ASTM-240;  
St 52-3 DIN 17100+321 ASTM-240;  
St 52-3 DIN 17100+410S ASTM-240;  
1020 AISH+321 ASTM-240; 1020 AISI+410S  
ASTM-240; Mn2Si+321 ASTM-240;

Mn2Si+410S ASTM-240;  
A 387 Gr11 ASTM+321 ASTM-240;  
A 387 Gr11 ASTM+410S ASTM-240;  
1022 AISI+321 ASTM-240;  
1022 AISI+410S ASTM-240;  
1022 AISI+321 ASTM-240;

XNi3MoD+321 ASTM-240;  
XNi2MoD+321 ASTM-240; SA387+321  
ASTM-240; F36(S)Z+321 ASTM-240;  
F36(S)Z+317LN; St 52-3 DIN 17100+316Ti  
ASTM-240; 321 ASTM-240+1022  
AISI+321 ASTM-240.

## specification of double-layer and triplex sheets and plates

overall dimensions of sheets	thickness, mm/in.	8-160 / 0.3-6.3
	width, mm/ft	1500-4100 / 4.9-13.5
	length, mm/ft	5000-12 000 / 16.4-39.4
mass of sheets, mt		1-24
thickness of clad metal, mm/in.		1-10 / 0.04-0.4
polythickness of clad metal within a sheet, mm/in.		
at sheet thickness up to 50 mm (up to 2 in.)		0.3-0.5 / 0.01-0.02
at sheet thickness from 51 up to 155 mm (from 2 up to 6.1 in.)		0.5-0.7 / 0.02-0.03



## clad metal sheets and plates are subjected to:

- 100% ultrasonic testing of metal continuousness and adhesion zone;
- mechanical properties test, including:
  - impact strength testing at below zero (up to -70 °C) and above zero (up +550 °C) temperatures;
  - testing after mechanical aging;
  - shearing test and cold bend test of clad metal;
- macrostructure analysis.

## clad metal sheets and plates

are supplied in accordance with requirements of GOST 10885-85 and special Technical Specification approved by Material Authority Organizations of Russian Federation, Federal Supervision Body for Nuclear and Radiation Safety, Russian Maritime Register of Shipping. Clad metal plates and sheets can be supplied as heat-treated as well as after uniform grinding of the clad metal.

## at the customer's request the

following processes are performed at the equipment of the Corporation: welding of clad metal sheets and plates of the above mentioned grades, rolling of shells diameter up to 4000 mm (13.1 ft), forming of elliptical heads diameter up to 3500 mm (11.5 ft) from clad sheets and plates of all thickness range.

**in 2002 production of the clad metal sheet won Golden Award for Quality at the exhibition "All-Russian mark. 21st century Quality mark".**



**OMZ**  
(Uralmash-Izhora Group)  
25/1, Ermolavsky lane, Moscow, 123379, Russia  
tel.: +7 095 974 6021; fax: +7 095 974 6022  
e-mail: mail@omz.ru www.omzglobal.com

## OMZ-SPECIAL STEELS

Izhorskiy Zavod, Kolpino, Saint-Petersburg, 196651, Russia  
Phone +7 812 322-8150  
Fax +7 812 461-0741  
e-mail: specsteel-spb@omzglobal.com  
<http://www.omzglobal.com>