

# PRODUCTS FOR THERMAL SPRAYING AND PTA CLADDING





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#### POWDERS for FLAME SPRAYING

Powder flame spraying is a commonly-used thermal coating process whereby a powdered additive material is fed into an oxy-fuel flame. This heat source creates a gas stream with a temperature in excess of 3,000°C and the thermal expansion of the combustion is then used to atomize and accelerate the additive particles onto the substrate. Like powder spraying, the substrate surface is generally un-molten during the process.

#### From Page 8



#### POWDERS for LASER CLADDING

Laser Cladding employs the high energy output of a laser to metallurgically bond a powder filler of wear or corrosion-resistant material to a wide variety of metallic substrates in a highly accurate pattern. This results in an overlay which is free of porosity and cracks. Penetration into the substrate is minimized and there is consequently a very low heat-affected zone. Resulting minimal dilution enhances single-layer properties of the cladding.

From Page 16

# QUALITY • KNOWLEDGE • SUCCESS

The main focus of the company is the production of high-quality welding consumables for hardfacing and thermal spraying.

The product range includes flux-cored wires for OPEN ARC (FCAW), MIG (MGAW) and submerged arc (SAW) welding.

Corodur® supplies complementary a wide range of stick electrodes for wear protection and high-alloyed materials, up to tungsten carbide products for most extreme wear conditions. Our products are used very successfully worldwide.

Benefit from our many years of experience and our know-how! Customer-oriented support and just-in-time service are a part of our strengths.

**WE SOLVE YOUR WEAR PROBLEMS!** 

A selection of our products and services, for thermal spraying and PTA cladding, can be found on the following pages.

#### FLUX-CORED WIRES for ARC SPRAYING

Arc spraying with flux-cored wires is a very powerful thermal spraying process. A DC arc melts two flux-cored wires, which are applied to the substrate in molten form by means of compressed air. The bond is non- metallurgical as the substrate surface remains un-molten in the process.



Plasma Transferred Arc (PTA) Welding is a thermal arc process for applying wear and corrosion resistant overlays on surfaces of metallic components. PTA uses using a constricted high-energy plasma arc to transfer the overlay to the base metal, thus forming a molten weld pool. Powder filler material is fed through the torch and introduced to the welding arc above the weld pool. The result is a strong, metallurgically bonded overlay that has better fusion and corrosion properties than a mechanically-bonded process.





### **ARC-SPRAYING**

Iron-base Flux-cored Wires



Product					Cherr	nical cor	npositio	on		Hardness	Gene		
	Cr %	Ni %	Si %	B %	Мо %	Nb %	Al %	W %	Mn %	C %	others		
Fe-Base													
SP 100	17									0,1		30-35 HRC	Repair of machine components
SP 101	27	0,5		4,5	4,0	3,5		6,5		1,2		68-70 HRC	Metal-metal friction, screws, mixers, hot sieves
SP 102	20		1,5	1,5					1,0	0,6	3,5 Ti	850 HVo, 3	Abrasion resistant and erosion resistant up to 650 ° C, hig
Sp 103	25	10	1,2	2	4				1,3	0,5	2 Cu	45 HRC	Polishable, good wear resistance at temperature up to 870
SP 104	21	8	1,1	2,3	3,2				1,2	0,2	2 Cu	53 HRC	Self-compacting up to 1000 HV, easy to grind, high elast
SP 105 HY	20		2,8						11	0,25	11 Co	350 HB	Cavitation resistant, erosion resistant, water turbine, hyd
SP 106	14	4,5	1,3	1,9				26 WC	0,6		6 TiC	66 HRC	Good abrasion resistance, anti-slip treads in industry and
SP 107	19	8,5	0,4						6	0,1		400 HB	Good corrosion resistance, cold hardening, good workabil
SP 108	26	3	1,6		0,8				1,6	1,7		40-42 HRC	Resistant to abrasion, corrosion, easily machinable
SP 111	30		1,3	2,8					1,0			40-45 HRC	Low friction coefficient, chrome replacement layers, valve
SP 112	27,5		1,5	3,8					1,5	0,1		1000-1150 HV0,1	Boiler erosion protection, temperature up to 650 $^{\circ}$ C
SP 113	18	12	0,8		2,7				1,7	0,20		200-240 HV	Comparable to 316L, good corrosion resistance
SP 115	28		1,2						1	5		50-55 HRC	High oxidation resistance and corrosion resistance, high strength, chrome su
SP 118Y	22						5				ıҮ	170-270 HV0,3	Good corrosion protection in gas atmosphere against sulfur
SP 120	14	0,4	0,5						0,8	0,35		30-45 HRC	Good corrosion and wear resistance, hard, repair and processin relatively high layer thicknesses
SP 121							5,5		1	2		30-35 HRC	High carbon content, especially as a slip-resistant coating for t
SP 124		2	1	4,5					2	0,7		58-62 HRC	Can be used as a layer in cylinder liners
SP 126	14	5,5	1,3	4,5		7	2		1			64-67 HRC	Highly wear-resistant, very good corrosion resistance. Tempera
SP 129	38	35		2		1,5				0,1		1000-1150 HV0,1	Excellent erosion protection on boiler pipe walls and superheat protection sleeves, bearings for motors, plungers and compone
SP 132	15		0,7		3,2				0,4	0,1	14 Co	480-540 HV0,1	Tools for hot pressing of sheet metal parts, valve cones, seat ri
SP 155	29		1,2						0,6	4,8		55 - 59 HRC	Pumps, mixers, agitators, concrete pumps, transport augers

Fe-Base + FTC									
SP 402		4,5	2,5			0,4	62 FTC	hardness FTC: 2400 HV 0,1	COROCARB SP 402 is a flux-cored wire based on FeBSi with corrosion resistance, the alloy also has excellent abrasion r

#### eral characteristics

gh adhesion resistance

o ° C, for repair layer

ticity, for intermediate and top layers

/draulics

d ship decks

lity, for repair layers

e stem, plunger, bearing seat

ubstitute layer, high hardness

r and carbon, temperature-resistant up to 500 ° C, machinable, adhesion, boiler tubes

ing of machine parts, pump pistons, shaft surfaces, rollers, low shrinkage,

the coating of walk paths in industry and on ships

rature up to approx. 1000 ° C

ater pipes. Also suitable for press pistons, valve shafts, components from chemical plants, shaft nents which have been chromed so far.

ings in fittings

, transport trolleys on coke ovens.

th embedded highly wear-resistant carbides. In addition to excellent heat and resistance. The deposit is only limited grindable.



ARC-SPRAYING

Nickel-base Flux-cored Wires

Product				Chemi	cal comp	osition				Hardness	General charact
	Cr %	Si%	B %	W %	Mo %	Nb %	C %	Al %	others		
Ni-Base											
SP 201	20	4,7	3,2				0,7			500-800 HV0,1	Self-flowing alloy, subsequently fusible, chemical apparatus construction, food industry, plunger,
SP 206	20	4,5	1,6	2		0,35				500-800 HV0,1	Self-flowing alloy, subsequently fusible, chemical apparatus construction, food industry, plunger,
SP 221	20	4,5	0,7		2		0,4			500-800 HV0,1	Boiler biomass
Sp 222	20									90 HRB	Adhesive layer in aggressive environment
SP 223	50									250-280 HV0,1	Good resistance to sulfur at temperatures up to 650 ° C, coal firing power plants, black liquor boil
SP 224	45								1 Ti	32 HRC	Good resistance to sulfur, vanadium in boiler atmosphere at temperatures up to 650 ° C, coal firin
SP 225	22				9	3,5	0,05			240-300 HV0,1	Corrosion resistant to acids with chlorides, resistant to oxidation and hot gas corrosion, adhesive
SP 226	16			5	17		0,1			200-240 HB	High acid resistance in chlorine, resistant to oxidation and hot gas corrosion, chemicals, petroche
SP 227	15			3,5	15		0,1			35 HRC	High acid resistance in chlorine, resistant to oxidation and hot gas corrosion, chemicals, petroche
SP 228	25	0,4	2				0,4		15 SC	700-100 HV0,1	Adhesive layer
SP 229								20		55-80 HRB	Dense layers with better oxidation and HT corrosion resistance up to 650 $^\circ$ C, self-adhesive adhesi
SP 230								5		65 HRB	Adhesive layer
SP 231					6			5		78 HRB	Exceptional adhesion as an adhesive layer for the repair of chipable C-steels and corrosion-resistan good resistance to particle erosion
SP 232	8				5			7	5 Fe	100-120 HRB	For repairs, good machinable, corrosion resistant
SP 233								10		65 HRB	Adhesive layer
SP 234	21							7		75-85 HB	Adhesive layer for the repair of machine components, resistant to oxidation and hot gas corrosion
SP 241	21	4	4		6			10	<2 Fe	500-800 HV0,1	On evaporator walls and pipes in combustion plants.
SP 275	22				9			7		190 – 230 HV0,3	Typical applications as adhesive layer and for repairs in the chemical industry, petrochemical indu
SP 277	22	0,4			13			10	<3 Fe, <2,5 Co, 3 W, <0,35 V, <0,35 Mn	240 – 300 HV0,1	Typical applications as an adhesive layer and for repair in the chemical industry, petrochemical an
SP 278	27		1,5		17	2		7	<3 Fe, 1 W, 1 V	240 – 300 HV0,1	Typical applications as an adhesive layer and for repair in the chemical industry, petrochemical an

Ni-Base + FTC							
SP 400	5	2		0,7	62 FTC	hardness FTC: 2400 HV 0,1 matrix hardness: 540 HV 0,1	COROCARB SP 400 is a flux-cored wire based on NiBSi with embedded highly wear resistant carbic abrasion resistance. The deposit is only limited grindable.



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iston
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rs
power stations, pipes, boiler walls
ayer and repair, chemical industry
nical, offshore
nical, offshore
e layer
steels, Wear resistance by Mo, repairs, bearings,
easy machinable

stry and the offshore industry.

nd offshore industry, but also as corrosion protection in boilers.

d offshore industry, but also as corrosion protection in boilers.

des. In addition to excellent heat and corrosion resistance, the alloy also has excellent



**POWDERS FOR** 

**FLAME SPRAYING** 

#### Chemical composition General characteristics Product Grain size Hardness Ni % Cr % B % Si % C % Mo % others Nickel base alloys, gas atomized COROLOY FS 40 -106+38µm bal. 8 38 HRC Rust and acid resistant, resistant to strong abrasion and heat. 1,9 3,1 -0,5 -Application on small surfaces or matrices; Mold casting in the glass industry, fittings, pistons & guides. COROLOY FS 60 -106+38µm bal. 62 HRC Rust and acid resistant, resistant to strong abrasion and heat. 3,3 --17 4,3 1 Application on small surfaces or matrices; Mold casting in the glass industry, fittings, pistons & guides. COROLOY FS 286 -106+38µm bal. 58 HRC High corrosion resistance as well as good heat and abrasion resistance. 0,8 Cu=2,5 14 3 4 3 Bearings of transport augers, etc. Moderate corrosion resistance but good erosion and abrasion resistance. COROLOY FS 288 -106+38µm bal. 0,8 W=17 58 HRC 17 3 4 -Extrusion bins, hydropulipers, valves, mud pumps, etc.

Product	Grain size	Chemical com	position	Hard	dness	General charact
		COROLOY FS 60	FTC	Matrix	FTC	
NiBSi-matrix, blended wi	ith fused Tungsten	Carbides				
CORCARB FS 30	-106+38µm	70 %	30 %	62 HRC	2.300 HV±200HV	
CORCARB FS 40	-106+38µm	60 %	40 %	62 HRC	2.300 HV±200HV	
CORCARB FS 50	-106+38µm	50 %	50 %	62 HRC	2.300 HV±200HV	Rust and acid resistant, resistant to strong abrasion and heat.
CORCARB FS 60	-106+38µm	40 %	60 %	62 HRC	2.300 HV±200HV	Mechanical engineering, pump and mill construction, petrochemical, etc.
CORCARB FS 70	-106+38µm	30 %	70 %	62 HRC	2.300 HV±200HV	
CORCARB FS 80	-106+38µm	20 %	80 %	62 HRC	2.300 HV±200HV	



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### POWDERS FOR FLAME SPRAYING

Product	Grain size	Chemical composition		Hardness	General charact
		COROLOY FS 60	WC Co	Matrix	
NiBSi-matrix, blended wit	th WC Co-Pellets				
CORCARB FS 35 WC	-106+38µm	65 %	35 %	62 HRC	
CORCARB FS 40 WC	-106+38µm	бо %	40 %	62 HRC	Rust and acid resistant, resistant to strong abrasion and heat.
CORCARB FS 50 WC	-106+38µm	50 %	50 %	62 HRC	Mechanical engineering, pump and mill construction, petrochemical, etc.
CORCARB FS 80 WC	-106+38µm	20 %	80 %	62 HRC	



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#### POWDERS FOR PTA CLADDING

Product	Grain size	Chemic	al composition	Hard	Iness	General
		COROLOY 60 PTA	FTC	Matrix	FTC	
NiBSi-matrix, gas-atomize	ed, blended with I	тс				
COROCARB 610 PTA	-180+53µm	38-40 %	60-62 %	53 HRC	2.300 HV±200HV	Particularly high content of highly wear-resistant fused tungsten carbi wear-resistant cutting edges in recycling technology, screw bars as we
COROCARB 611 PTA	-180+53µm	38-40 %	60-62 %	40 HRC	2.300 HV ± 200HV	Crack-resistant alloy with a high proportion of wear-resistant fused tur ses, extremely wear-resistant cutting edges in recycling technology, sc
COROCARB 616 PTA	-180+53µm	38-40 %	60-62 %	53 HRC	2.300 HV±200HV	The alloy has a high content of thermodynamically stabilized FTC, whi Tools for deep drilling and petroleum industry.
COROCARB 620 PTA	-180+53µm	38-40 %	60-62 %	53 HRC	≥3.00 HV	The alloy has a particularly high content of spherical tungsten carbides wear-resistant cutting edges in recycling technology, screw flights and

Product	Grain size	Chemical composition							Hardness	General charac	
		Fe %	Cr %	C %	Si %	Mn %	V %	Ni %	Matrix		
Iron-base, gas-atomized,	powders with Van	adium Ca	arbides								
CORODUR 670 PTA	-180+38µm	bal.	6	3,5	1	1	12	-	58 HRC	The alloy has a particularly high content of highly wear-resistant vanadium carbides and can be crac Tools for mining, excavator parts, scrap presses, extremely wear-resistant cutting edges in recycling	
Corodur 671 PTA (corrosion resistance)	-180+38µm	bal.	17,5	4,3	1	1	12	+	58 HRC	The alloy has a high proportion of wear-resistant vanadium carbides and can be crack-free processed Technical knives, recycling industry, agricultural engineering.	

#### characteristics

ides (FTC). Tools for deep drilling and mining, excavator parts, scrap presses, extremely ell as components from agricultural engineering.

ingsten carbides (FTC). Tools for deep drilling and mining, excavator parts, scrap prescrew bars as well as components from agricultural engineering.

ich is characterized by a very high hardness, with comparatively high toughness.

s (sFTC). Tools for deep drilling and mining, excavator parts, scrap presses, extremely d components from agricultural engineering as well as pumps and mills.

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cked without cracking. g technology, cutting edges, etc.

d.





#### POWDERS FOR PTA CLADDING

Product	Grain size				Chemic	al comp	osition				Hardness	General
		Co %	Cr %	W %	Mo %	C %	Ni %	Si %	Mn %	Fe %		
Cobalt-base powders, gas-	-atomized											
COROLIT 1 PTA	-150+53µm	bal.	30	12,5	-	2,5	+	1,8	1	≤3,5	54 HRC	Abrasion, erosion, corrosion, cavitation at high temperatures. Valves, grinding and crumbs, wear rings, wear elements in the chemica
COROLIT 6 PTA	-150+53µm	bal.	30	4,5	-	1,2	+	1,2	0,5	≤3,5	42 HRC	Abrasion, erosion, corrosion, cavitation at high temperatures. Valves, grinding and crumbs, wear rings, wear elements in the chemica
COROLIT F PTA	-150+53µm	bal.	25	12,0	-	1,8	24	0,5	0,5	≤3,5	42 HRC	Cavitation, corrosion, erosion and abrasion. Marine diesel engines, engine technology, etc.
COROLIT 12 PTA	-150+53µm	bal.	29	8,0	-	1,5		1,7	0,5	≤3,5	50 HRC	Abrasion, erosion, corrosion, cavitation at high temperatures. Processing tools of the hardwood, paper and plastic industry, extruder s
COROLIT 21 PTA	-150+53µm	bal.	27	-	5,5	0,3	2,5	0,5	0,5	≤3,5	300 HB	Corrosion, impact load at high temperatures or even extreme temperatu Hot punching tools, exhaust valves, steam and acid fittings, seawater d

Product	Grain size				Chemic	al comp	position			Hardness	General c
		Ni %	Cr %	Β%	Si %	C %	Mo %	Nb %	others		
Nickel-base powders, gas-	-atomized										
COROLOY 201 PTA	-150+53µm	bal.	15	3	4,6	0,7	-	-	1	58 HRC	High hot hardness, corrosion resistance, thermal shock resistance and hi Chemical apparatus manufacturing, food industry, nuclear technology, fi
COROLOY 255 PTA	-150+53µm	bal.	17	2	5	1	-	-	0,5	53 HRC	Abrasion and corrosion resistant. Plastic industry, extruder screws, etc.
COROLOY 256 PTA	-150+53µm	bal.	17	2	5	1	-	-	-	53 HRC	Abrasion and corrosion resistant. Plastic industry, extruder screws, etc.
COROLOY 260 PTA	-150+53µm	bal.	-	3	3	-	-	-	0,5	42 HRC	Self-flowing nickel alloy with high hardness.
COROLOY 625 PTA	-150+53µm	bal.	22	-	0,4	-	9,1	3,5	Fe<0,8	220 HB	High corrosion resistance to a variety of chemical substances, against in Chemical industry, waste incineration plants, flue gas desulphurization p

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l industry, etc.

l industry, etc.

screws as well as for valve spindles and earth drills, etc.

ure changes (thermal shock resistance). desalination plants, etc.

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nigh wear resistance. fittings, oil press, paper industry, press augers, etc.

ntercrystalline corrosion and is sea water resistant. plants, seawater desalination plants, etc.



# POWDERS FOR LASER CLADDING

Product	Grain size			Chemic	al comp	osition			Hardness	Genera	l charact
		Ni %	Cr %	B %	Si %	C %	Mo %	Nb %			
Nickel-base powders, gas-	-atomized										
COROLOY 260 LS	-90+45µm	bal.	-	3	3	-	-	-	53 HRC	Self-flowing nickel alloy with high hardness.	

Product	Grain size	Chemical comp	position	Hardness		General characte
		COROLOY 60 PTA	FTC	Matrix	FTC	
NiBSi-matrix, blended wi	th fused Tungsten	Carbide				
COROCARB 610 LS	-90+45µm	38-40 %	60-62 %	53 HRC	2.300 HV±200HV	Particularly high content of highly wear-resistant tungsten melt carbide (WSC). Tools for deep drilling and mining, excavator parts, scrap presses, extremely wear-resistant cuttin engineering as well as pumps and mills.



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ng edges in recycling technology, screw flights and components from agricultural





## YOUR NEED IS OUR CHALLENGE

No matter what your industry focus or wear challenge,  $\mathsf{CORODUR}^{\circledast}$ 

tions you can trust. From the known to the unknown,  ${\rm CORODUR}^{\circledast}$ 

maintains and shares a wealth of knowledge and data collected

over almost 40 years from established process industries operating

across all continents. Research and Development is central to our advanced production site in Willich, Germany and we also maintain links with centres of excellence around the world to provide the

most rapid and flexible response to customer demand.

CORODUR<sup>®</sup> Wear Protection Solutions





CORODUR's highly qualified and experienced sales team can be relied upon to provide accurate and timely advice regarding both the right product and the correct application method.

Our customer-centric ethos ensures delivery of only the highest-quality products, combined with state-of-the-art solutions.

# **MICROSCOPIC THIN-SECTION** TAKEN FROM CLAD SURFACES





# FORMS OF PACKAGING

WIRE BASKE	WIRE DRUM	
Net weight:	15 kg	Net weight:
External diameter:	300 mm	Diameter:
Diameter (inside):	51.5 mm	Height:
Vidth:	103 mm	
N 759/BS 300		Net weight:
		Diameter:
et weight:	25 kg	Height:
xternal diameter:	435 mm	
Diameter (inside):	300 mm	
Vidth:	105 mm	
EN 759/BS 450		

#### PLASTIC BOTTLE

Net weight:

5 kg





#### PLASTIC SPOOL

100-150 kg 550 mm 400 mm

Net weight: External diameter: Diameter (inside): Width: R 435

25 kg 435 mm 300 mm 90 mm

150/300 kg 550 mm

