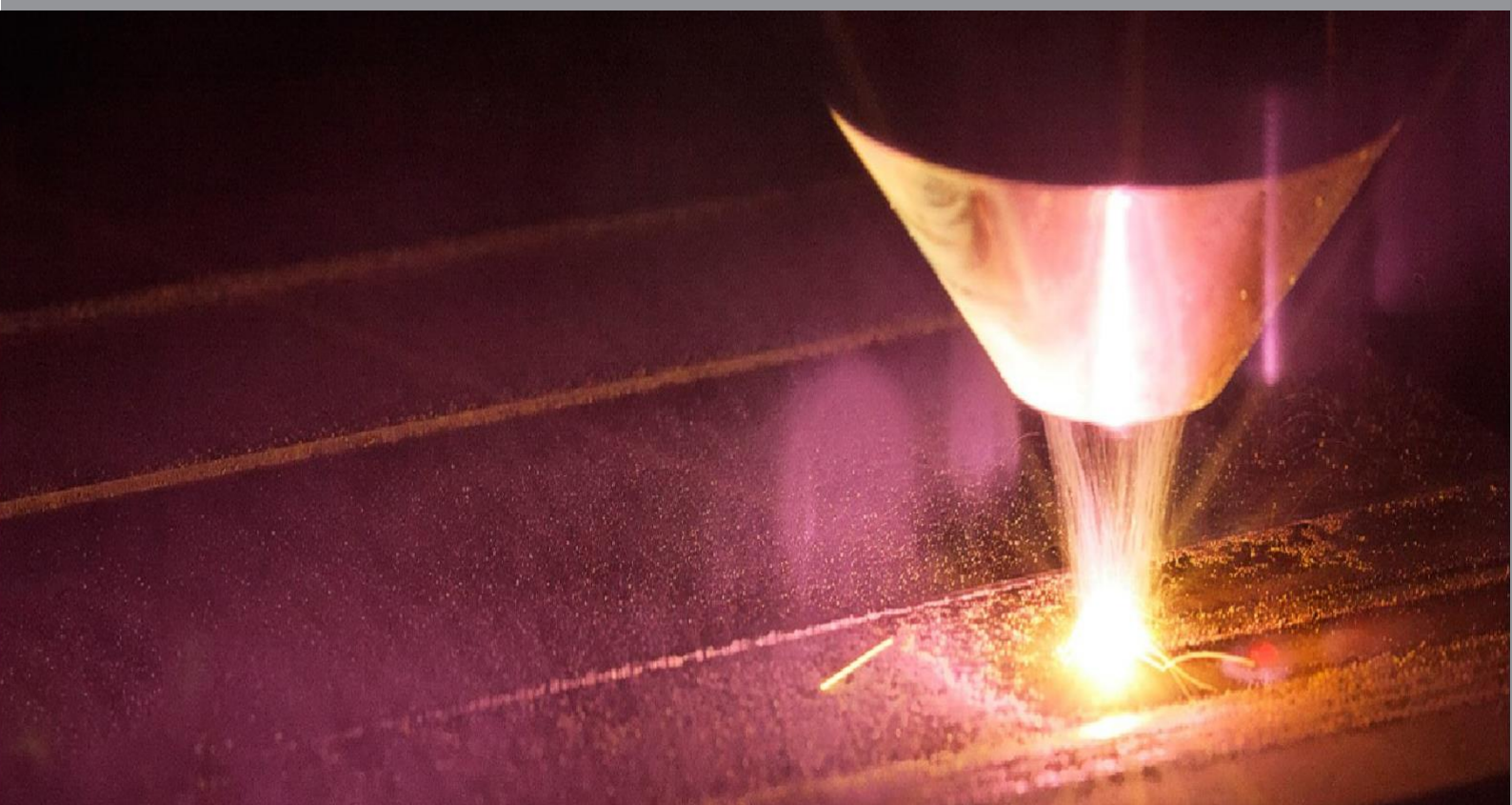


# CLADDING AND HARDFACING POWDERS

GTV consumables for Laser Cladding



# LASER CLADDING AND HARDFACING POWDERS

## Ni: NICKEL BASED POWDERS

GTV No.	Description	Particle size	Hardness	C	Ni	Cr	B	Si	Fe	Mo	Others
31.25.10 LFE	Inconel 625	-160 +53 µm	200 HV	≤0.03	bal.	21.0	-	0.4	1.4	9.0	Nb=3.5
31.96.10	Hastelloy C276	-160 +53 µm	210 HV	≤0.02	bal.	15.2	-	0.1	3.0	15.5	W=3, Co=2
31.10.10	NiBSi 22 HRC	-150 +53 µm	22 HRC	-	bal.	-	1.3	2.3	1.0	-	-
10.11.6	NiCrBSi 30 HRC	-125 +45 µm	30 HRC	0.15	bal.	7.0	1.25	3.4	3.0	-	-
10.12.6	NiCrBSi 40 HRC	-125 +45 µm	40 HRC	0.25	bal.	7.5	1.7	3.5	2.5	-	-
31.14.10	NiCrBSi 50 HRC	-150 +53 µm	50 HRC	0.5	bal.	14.0	2.5	3.7	4.0	-	-
31.15.10	NiCrBSi 60 HRC	-150 +53 µm	60 HRC	0.75	bal.	14.0	3.3	4.5	4.5	-	-
10.16.6	NiCrBSi CuMo	-125 +45 µm	58 HRC	0.5	bal.	16.0	3.5	4.5	3.5	3.0	Cu=3

### 31.25.10LFE

-160 +53 µm / gas atomised / 200 HV

NiCrMoNb based alloy similar to Inconel 625. Excellent corrosion resistance in wide range of environments, high temperature oxidation resistance, resistance to stress corrosion cracking, good wear resistance and high ductility.

Typically used for repair and surfacing of similar nickel based super alloys, non-alloyed, low alloyed and high alloyed steels.

Typical applications:

Components exposed to corrosive environments, high temperatures and mechanical stress in chemical or petrochemical industry, power engineering, aerospace, etc.

### 31.96.10

-160 +53 µm / gas atomised / 210 HV

NiCrMoW based alloy similar to Hastelloy C276. Excellent corrosion resistance in hot contaminated mineral acids, chlorine and chloride contaminated media, resistance to strong oxidisers and wet chlorine gases, resistant to pitting, crevice corrosion and stress corrosion cracking.

Typical applications:

Typically used in chemical and petrochemical processing applications as well as hot working tools such as hot forging dies, punches, press tools, etc.

### 31.10.10

-150 +53 µm / gas atomised / 22 HRC

NiBSi based alloy with good oxidation and wear resistance, good machinability, typically used for repair of cast iron and repair of machining errors.

### 10.11.6

-125 +45 µm / gas atomised / 30 HRC

NiCrBSi based alloy with good corrosion and wear resistance, used for applications, where good machinability is required and hardness of 30 HRC is sufficient.

Typical applications:

Rebuilding and repairing of plungers in glass manufacturing industry, valves, pumps, rolls, etc.

### 10.12.6

-125 +45 µm / gas atomised / 40 HRC

NiCrBSi based alloy with good corrosion and wear resistance - higher than 10.11.6.

Typical applications:

Rebuilding and repairing of plungers in glass manufacturing industry, bearings, valve gates, pump sleeves, etc.

### 31.14.10

-150 +53 µm / gas atomised / 50 HRC

NiCrBSi based alloy with excellent resistance to wear and corrosion in various process media, surfaces resistant to wear by abrasive grains, particle erosion and cavitation, further improvement of abrasion resistance can be achieved by mixing with tungsten carbides.

Typical applications:

Bearings, diesel engine valves, valve seats, rocker arms, screw conveyors, pump sleeves, seal rings, piston rods, mixer blades, chip knives, etc.

### 31.15.10

-150 +53 µm / gas atomised / 60 HRC

NiCrBSi based alloy with excellent resistance to wear and corrosion in various process media, surfaces resistant to wear by abrasive grains, particle erosion and cavitation, further improvement of abrasion resistance can be achieved by mixing with tungsten carbides.

Typical applications:

Bearings, diesel engine valves, valve seats, rocker arms, screw conveyors, pump sleeves, seal rings, piston rods, mixer blades, chip knives, etc.

### 10.16.6

-125 +45 µm / gas atomised / 58 HRC

NiCrBSi based alloy with addition of Cu and Mo, better corrosion resistance in acidic or alkaline media and better resistance to cracking compared to Cu and Mo free NiCrBSi alloys.

Typical applications:

Applications requiring wear and corrosion resistance in chemical and petrochemical industry, etc.

# LASER CLADDING AND HARDFACING POWDERS

## Co: COBALT BASED POWDERS

GTV No.	Description	Particle size	Hardness	C	Ni	Cr	Co	Si	W	Fe	Mo
31.01.10	Stellite 1	-150 +53 µm	55 HRC	2.5	-	30.0	bal.	-	12.0	-	-
31.06.10	Stellite 6	-150 +53 µm	40 HRC	1.1	-	28.0	bal.	-	4.0	-	-
31.06.10SF	Stellite SF6	-150 +53 µm	50 – 51 HRC	0.7	14.5	19	bal.	2.5	7.5	1.6	-
31.12.10	Stellite 12	-160 +53 µm	48 HRC	1.5	-	28.0	bal.	-	8.0	-	-
31.21.10	Stellite 21	-160 +53 µm	30 - 45* HRC	0.25	2.8	27.0	bal.	1.0	-	1.5	5.5
31.64.10	T-400	-150 +53 µm	53 HRC	0.01	0.5	9.0	bal.	2.7	-	0.5	29.5
31.68.10	T-800	-150 +53 µm	53 - 60 HRC	<0.08	<1.5	18.0	bal.	3.4	-	<1.5	28.0

Stellite and Tribaloy are registered trademarks of Kennametal Stellite.  
Index\*: Hardness values after work hardening

### 31.01.10

-150 +53 µm / gas atomised / 55 HRC

Cobalt based alloy with chemical composition similar to Stellite 1, hardest of the standard cobalt base alloys retaining its hardness at temperatures up to 730 °C, but more crack sensitive than other cobalt based alloys.

High content of carbides in a cobalt matrix, providing excellent resistance to abrasion and solid particle erosion and good general corrosion resistance.

Typical applications:

Applications, where high wear resistance (especially abrasion resistance) is required, such as pump and bearing sleeves, rotary seal rings, etc.

### 31.06.10

-150 +53 µm / gas atomised / 40 HRC

Most widely used cobalt based alloy, providing excellent resistance to many forms of chemical and mechanical degradation over a wide temperature range, good resistance to impact and cavitation, better impact resistance than 31.01.10 retaining its hardness at temperatures up to 500 °C.

Typical applications:

Due to its outstanding anti-galling properties and low friction coefficient in case of self-mated surfaces 31.06.10 is recommended for hardfacing on valve seats, steam valves, bearing areas, etc.

### 31.06.10SF

-150 +53 µm / gas atomised / 50 - 51 HRC

Self-fluxing cobalt alloy with excellent resistance to many kinds of chemical and mechanical material removal over a wide temperature range, good resistance to impact stress and cavitation.

Typical applications:

Pump components and other components that are exposed to high abrasive stress and whose base material has a relatively low thermal expansion.

### 31.12.10

-160 +53 µm / gas atomised / 48 HRC

Cobalt based alloy with chemical composition similar to Stellite 12, better abrasion and erosion resistance than 31.06.10, better resistance to impact and thermal shocks than 31.01.10.

Typical applications:

Typically used for cutting tools, cutting edges in plastic, paper and textile industry, saw blades and tips in wood industry, etc.

### 31.21.10

-160 +53 µm / gas atomised / 30 HRC, 45 HRC\*

Cobalt based alloy with chemical composition similar to Stellite 21 alloy, excellent resistance to hot corrosion, thermal and mechanical shock and to oxidizing and reducing gaseous atmospheres up to 1100 °C. The weld metal is work hardening, has excellent metal-to-metal sliding wear resistance and is highly resistant to impact, not recommended for severe hard particle abrasion.

Typical applications:

Parts subject to corrosion, impact wear as well as high temperatures or thermal shocks such as engine valves, gas turbines components, hot working tools such as forging or stamping dies, etc.

### 31.64.10

-150 +53 µm / gas atomised / 53 HRC

CoMoCrSi based alloy with chemical composition similar to Tribaloy T-400, exhibits high corrosion resistance, high oxidation resistance at elevated temperatures, high resistance to wear and galling with good hot hardness, resists fretting wear in case of lack of lubrication.

Typical applications:

Pump components, valve seats, valve faces, ball and roller bearings, journal bearings, etc.

### 31.68.10

-150 +53 µm / gas atomised / 53 - 60 HRC

CoMoCrSi based alloy with chemical composition similar to Tribaloy T-800, exhibits high corrosion resistance, high oxidation resistance at elevated temperatures (higher than T-400), high resistance to wear and galling with good hot hardness.

Typical applications:

Pump components, valve seats, valve faces, ball and roller bearings, journal bearings, etc.

# LASER CLADDING AND HARDFACING POWDERS

## Fe: IRON BASED POWDERS

GTV No.	Description	Particle size	Hardness	C	Ni	Cr	Mn	Si	Fe	Mo
31.42.10	431	-150 +53 µm	300 - 400 HV	≤ 0.2	1.25 - 2.5	15 -17	≤ 1.0	≤ 1.0	bal.	-
31.46.10	316L	-160 +53 µm	160 HV	≤0.03	12.0	17.0	1.5	0.8	bal.	2.5
31.91.10	410L	-160 +53 µm	220 HV	≤0.03	-	12.5	0.1	0.5	bal.	-

### 31.42.10

-150 +53 µm / gas atomized / 220 HV

Martensitic nickel-chromium steel with better corrosion resistance than steels of type 403 or 410, 420 and 430, offering good corrosion resistance and high wear resistance in a variety of applications.

Typical applications:

Mechanically highly stressed machine parts, such as valves, pump and valve shafts and compressor wheels.

### 31.46.10

-160 +53 µm / gas atomised / 160 HV

Austenitic nickel-chromium steel powder, resistant to corrosion, pitting and intercrystalline corrosion up to temperatures of 400 °C, scale resistant up to 800 °C. Easy machining, mirror finishing possible.

Typical applications:

Corrosion resistant surfaces for chemical industry, food processing industry as well as buffer layers for hardfacing.

### 31.91.10

-160 +53 µm / gas atomised / 220 HV

13% Cr steel powder for surfacing on similar Cr steels and cast steels.

Typical applications:

Suitable for surfacing of sealing faces of water, gas and steam valves at service temperatures up to 450 °C.

GTV No.	Description	Particle size	Hardness	C	Si	Mn	Cr	Mo	V	Fe
31.40.10	FeCrV15	-150 +50 µm	62 - 66 HRC	4.5	1.2	1.0	14.5	1.0	15.0	bal.
31.47.10	FeCrV12	-150 +50 µm	55 - 60 HRC	3.0	1.2	1.0	5.5	1.0	12.5	bal.

### 31.40.10

-150 +50 µm / gas atomised / 62 - 66 HRC

Wear protection alloy, particularly against abrasive wear, with very good weldability. Corrosion-resistant, heat resistant up to 550 °C.

Typical applications:

Cutting blades for agriculture and food industry, extruder screws and components from the civil engineering and mining.

### 31.47.10

-150 +50 µm / gas atomised / 55 - 66 HRC

Wear protection alloy, particularly against abrasive wear, with very good weldability. Better impact resistance than 31.40.10 at reduced abrasion resistance.

Typical applications:

Cutting blades for agriculture and food industry and impact-stressed components e.g. in forming technology.

GTV-No.	Description	Particle size	Hardness	Cr	Nb	Ni	Co	Cu	W	Fe
80.99.1	FeCrMoNb	-53 +10 µm	n.a.	21,0	2,0	-	-	-	-	bal.

### 80.99.1

-53 +10 µm / gas atomised

Seawater resistant anti-corrosion alloy (PREN 34 – 41)

Typical applications:

Corrosion protection of hydraulic cylinders, incl. offshore applications; protective coatings for brake discs, also in combination with NbC/FeCr, TiC/FeCr or (spherical) tungsten carbides

# LASER CLADDING AND HARDFACING POWDERS

## CARBIDE REINFORCED POWDERS

GTV No.	Description	Particle size	Matrix hardness	Carbide type
31.33.10	NiBSi / WSC 40 / 60	-160 +53 µm	50 HRC	spherical
31.34.10	NiCrBSi / WSC 50 / 50	-160 +53 µm	50 HRC	fused and crushed, blocky
31.37.10	NiCrBSi / FTC 50 / 50	-160 +53 µm	60 HRC	fused and crushed, blocky

### 31.33.10

-160 +53 µm

Mixed powder with chromium-free self-fluxing nickel based alloy matrix for protection against extreme abrasive wear.

Typical applications:

Applications in mining, oil and gas exploration, general engineering (especially plastics machinery), compared to 31.34.10 significantly harder carbides, whose spherical shape causes considerably reduced material removal under some wear conditions.

### 31.34.10

-160 +53 µm

Mixed powder with chromium-free self-fluxing nickel based alloy matrix for protection against extreme abrasive wear.

Typical applications:

Applications in mining, oil and gas exploration, general engineering (especially plastics machinery), as well as for pumps, mills, excavation tools and scrap presses.

### 31.37.10

-160 +53 µm

Mixed powder with self-fluxing nickel based alloy matrix for protection against extreme abrasive wear.

Typical applications:

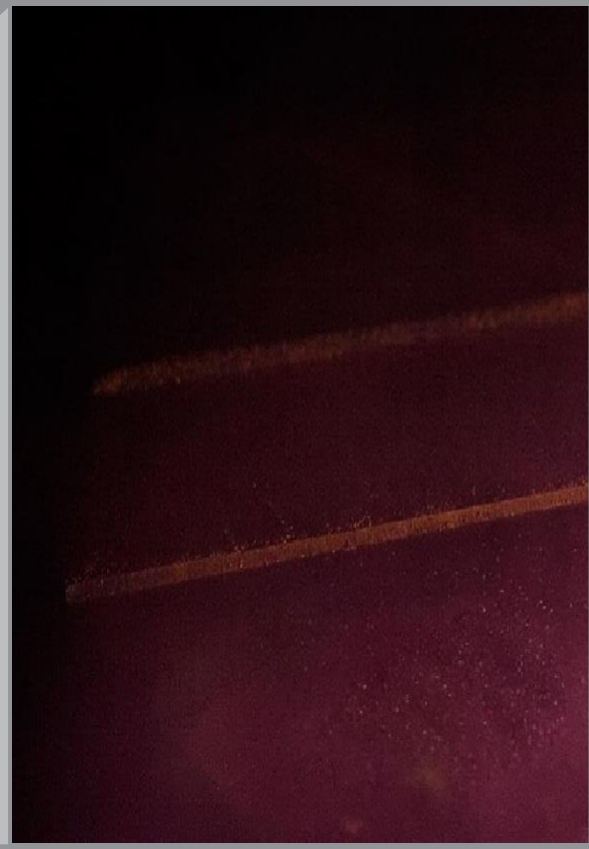
Applications in mining, oil and gas exploration as well as for excavation tools.

Various mixing ratios with different matrix hardness are possible.



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GTV Verschleiss-Schutz GmbH  
Gewerbegebiet „Vor der Neuwiese“, D-57629 Luckenbach, Germany  
Phone: +49 (0)2662 95 76-0, Fax: +49 (0)2662 95 76-30  
E-Mail: [office@gtv-mbh.de](mailto:office@gtv-mbh.de), Internet: [www.gtv-mbh.de](http://www.gtv-mbh.de)