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DURMAT® Flux-Cored Wires
for Wear Protection

Wear Solutions with Creative Ideas



DIN EN ISO 9001:2008
Zert. Nr. 01 100 040463

DURUM VERSCHLEISS-SCHUTZ GmbH („DURUM“) was founded as a manufacturer of materials for wear protection in Mettmann near Düsseldorf in 1984.

For more than 30 years, DURUM has been dealing with development and manufacture of materials for application welding and thermal spraying to protect parts from wear and corrosion. The company sells its products in more than 80 countries around the world. Due to the many years of experience, new wear-resistant and high-quality materials on cobalt basis were developed as well and successfully introduced on the market as flux-cored wires, electrodes and powders.



Due to the very high wear and corrosion resistance, in particular at high usage temperatures, DURMAT® cobalt base hard alloys may permit considerable service life extensions. The user profits of:

- **Longer component service lives**
- **Longer machine runtimes**
- **Lower exchange costs**
- **Cost savings from longer service lives and reduced downtimes**

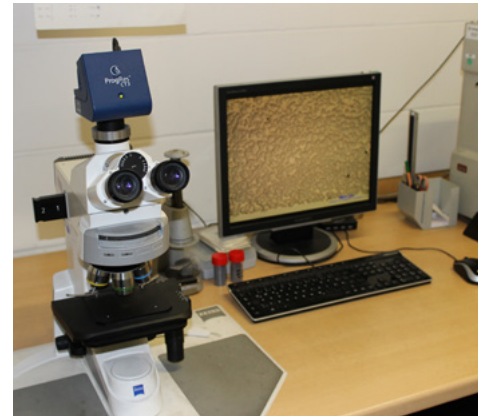
- **Regeneration of wear surfaces instead of purchase of new parts**
- **Implementation of use at higher working temperatures**
- **Higher economic efficiency**

We coat the parts provided by you based on drawings or dimension sheets. DURUM cooperates with renowned institutes and universities that ensure close contact between researchers, metallurgists and customers in the development

of new materials and technologies. We analyse your wear problem and will offer you a customised solution with clear added value for your product. Research, development and fabrication in the users' interest is the leading principle of DURUM. Your success is our objective.

We meet the demanding requirements of today's industry with a wide array of Welding and Thermal Spray products including Flux Cored Wire, PTA (Plasma Transferred Arc) our famous oxy-acetylene products and last but not least our Thermal Spray Powder and Wire.

Today we have a world-class solution developed for every aspect of wear, typically encountered throughout the industry that outperforms competitive products in the market.



Our wide range of specialized surface hard-facing materials includes:

- Tungsten Carbide Rods for Oxy-acetylene Welding
- Stellite* - Flux-Cored Wires
- Nickel-, and Iron-based Flux-Cored Wires
- FCAW wires with Tungsten Carbide
- Tungsten Carbides, Complex Carbides and Chromium Carbides for manual Arc Welding
- PTA Welding Powders, Fe-Ni-Co based Powders and special qualities
- PTA machines, torches and powder feeders
- Powders and Wires for Laser Cladding
- Powders for Oxy-acetylene Welding and Spraying
- Fused Crushed and Spherical Fused Tungsten Carbides
- Pre-manufactured replacement wear parts
- Tungsten Carbide Wear Plates
- Wear Plates with Chromium Carbides and Complex Carbides
- Thermal Spray Powders (conforming to DIN EN 1274)
- Thermal Spray Wires (conforming to DIN EN 14919)

* Stellite is a registered trademark of Kennametal Stellite

Metal- and Flux Cored Tungsten Carbide Wire

DURMAT® DIN EN 14700 DIN 8555	TYPICAL APPLICATIONS AND CHEMICAL COMPOSITION	HARDNESS	TYPICAL PROPERTIES
OA T Fe20 MF 21-65GZ	Fe-Matrix with 50 - 62 % FTC Tools and machine parts exposed to wear in mining, excavation, earth moving, tunneling shields, road construction, well drilling and deep drilling applications)	FTC: ≈ 2,360 HV _{0,1} Weld metal: 64 - 66 HRC _{1, Lage} 66 - 68 HRC _{2, Lage}	• Open arc tubular wire filled with Fused Tungsten Carbide for semi-automatic applications, where extreme abrasive wear is anticipated
NICRW T Fe20 MF 21-65GZ	NiCr-Matrix with 50 - 62 % FTC Protects surfaces against a combination of extreme abrasive and corrosive attacks	FTC: ≈ 2,360 HV _{0,1} Matrix: 490 - 540 HV _{0,1}	• Similar to DURMAT® NIFD, but containing a higher chrome content • Low melting range (900 - 1050 °C) • Highly resistant to acids, bases and other corrosive media
NIFD T Ni20 MF 21-55- CGTZ	Ni-Matrix with 50 - 62 % FTC Repairing and hard-facing ferritic and austenitic steel tools and machine parts (steel casting). Welding on tool joints and stabilizers in the petroleum industry	FTC: ≈ 2,360 HV _{0,1}	• Flux cored wire with Fused Tungsten Carbide and NiCrBSi- matrix for semi-automatic welding application • Protects surfaces against a combination of extreme abrasive and corrosive attacks
NIFD - PLUS T Ni20 MF21-55-CGZ	Ni-Matrix with 50 - 63 % SFTC Repairing and hard-facing ferritic and austenitic steel tools and machine parts. Semi and fully automatic welding on tool joints and stabilizers.	SFTC: ≈ 3,000 HV _{0,1}	• Similar to DURMAT® NIFD, but filled with Spherical Fused Tungsten Carbide
NI2 T Ni20 MF21-55-CGZ	Ni-Matrix with 50 - 62 % FTC and Special Carbides Protects surfaces against a combination of extreme abrasive and corrosive attacks	FTC: ≈ 2,360 HV _{0,1} Matrix: ≈ 450 - 480 HV _{0,1} Other carbides: ≈ 2,900 HV _{0,1}	• Cored metal wire filled with a combination of very hard special carbides together with fused tungsten carbides and Ni-Cr-B-Si for semi-automatic welding
NI2 - PLUS T Ni20 MF21-55-CGZ	Ni-Matrix with 50 - 62 % SFTC and Special Carbides Protects surfaces against a combination of extreme abrasive and corrosive attacks	SFTC: ≈ 3,000 HV _{0,1} Matrix: ≈ 450 - 480 HV _{0,1} Other carbides: ≈ 2,900 HV _{0,1}	• Similar to DURMAT® NI2, but filled with Spherical Fused Tungsten Carbide
FD 773 T Ni20 MF 21-55-CGZ	NiCr-Matrix with 50 - 62 % DNK 1.3 Protection of surfaces against a combination of extreme abrasive and corrosive attacks	DNK 1,3: >1,950 HV _{0,5} Matrix: 490 - 540 HV _{0,1}	• Good corrosion protection against chloride media
FD 774 T Ni20 MF 21-55-CGZ	Co-Matrix with 50 - 62 % DNK 1.3 Protection of surfaces against a combination of extreme abrasive and corrosive attacks	DNK 1,3: >1,950 HV _{0,5} Matrix: 450 - 480 HV _{0,1}	• Good corrosion protection against chloride media
FD 778 T Ni20 MF 21-55-CGZ	NiFe-Matrix with 50 - 62 % FTC Protection of surfaces against a combination of extreme abrasion and corrosion	FTC: ≈ 2,360 HV _{0,4} Matrix: 490 - 540 HV _{0,1}	• Lower melting point than commonly used iron based Flux Cored Wires with FTC filling • Smooth and clean surface • Good resistance to corrosive media
FD 779 T Ni20 MF21-55-CGZ	Ni-Matrix with 50 - 62 % MCWC Protection of surfaces against a combination of extreme abrasion and corrosion	MCWC: > 1,630 HV _{0,1} Matrix: 490 - 540 HV _{0,1}	• Resistant against extreme abrasive wear in combination with corrosion • Low melting range, self fluxing characteristic producing a smooth and clean surface
FD 780 T Ni20 MF 21-55-CGZ	NiFe-Matrix with 50 - 62 % MCWC Protection of surfaces against a combination of extreme abrasion and corrosion	MCWC: > 2,000 HV _{0,1} Matrix: 490 - 540 HV _{0,1}	• Resistant against a combination of extreme abrasive and corrosive wear • Low melting point, self fluxing characteristic producing a smooth and clean surface • Good resistance to corrosive media
FD 789 T Ni20 MF 21-55-CGZ	Ni-Matrix with 50 - 62 % DNK 1.3 Protection of surfaces against a combination of extreme abrasive and corrosive attack	DNK 1,3: > 1,950 HV _{0,5} Matrix: 450 - 480 HV _{0,1}	• Good corrosion protection against chloride media

DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL											HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe		
FD 200 K	DIN EN 14700: T Fe-10-200-CKNPZ / DIN 8555: MF 8-200-CKNPZ											180 - 200 HB When hardened: 400 - 450 HB	<ul style="list-style-type: none"> Stainless, antimagnetic and workhardening. Heat resistant up to 850 °C. Can be applied as a buffer layer.
	Repair of manganese steel buckets and shovels, high tensile tools & dies, clutches, crane wheels, earthmoving undercarriage parts, gear wheels, etc.												
	0.1	0.5	6	19	8.5	-	-	-	-	-	Bal.		
FD 240 K	DIN EN 14700: T Fe9-250-KNP / DIN 8555: MF 7-250-KNP											200 - 230 HB When hardened: 400 - 450 HB	<ul style="list-style-type: none"> Austenitic flux cored wire. Designed for repairing worn parts of similar to base materials as well as for hard-facing carbon steels parts against severe impact loads.
	Hardfacing of crushers, swing hammers, railway crossings, dredge buckets, etc.												
	1.1	0.3	14	4	0.6	-	-	-	-	-	Bal.		
FD 250 K	DIN EN 14700: T Fe9 / DIN 8555: MF 7-250-KNP											230 - 260 HB When hardened: 450 - 500 HB	<ul style="list-style-type: none"> Austenitic flux cored wire of the Mn-Cr-type. High plasticity: can be applied as a buffer layer. Corrosion resistant, antimagnetic, impact-resistant.
	Repair of manganese steel buckets and shovels, high tensile tools & dies, clutches, crane wheels, earthmoving undercarriage parts, gear wheels, etc.												
	0.5	0.5	16	14	1.2	0.6	-	-	0.2	-	Bal.		
FD 270 K	DIN EN 14700: T Fe9 / DIN 8555: MF 7-250-KNP											250 HB When hardened: 500 HB	<ul style="list-style-type: none"> Ductile austenitic matrix alloy bearing Cr and Nb (Cb) - Carbides. High wear resistance.
	Hardfacings of blast furnace sealings												
	1.1	-	19	8	-	-	-	3	-	-	Bal.		
FD 295 HY	DIN EN 14700: Fe Z9-300-CKP											280 - 300 HB When hardened: 450 HB	<ul style="list-style-type: none"> Austenitic matrix. Resistant to corrosion, erosion and cavitation. Hot cracking resistant.
	Water turbines, valves and components in the field of hydraulic or gas plants												
	0.2	<3	9-11	18-20	-	-	9-11	-	-	-	-		



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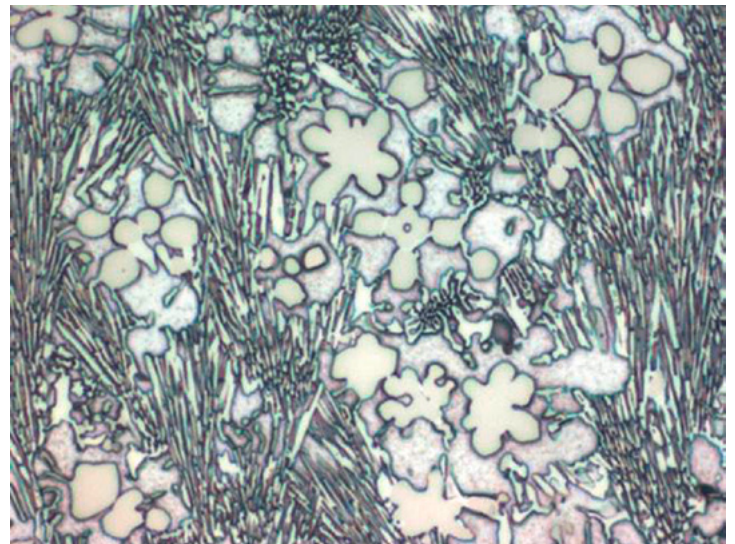
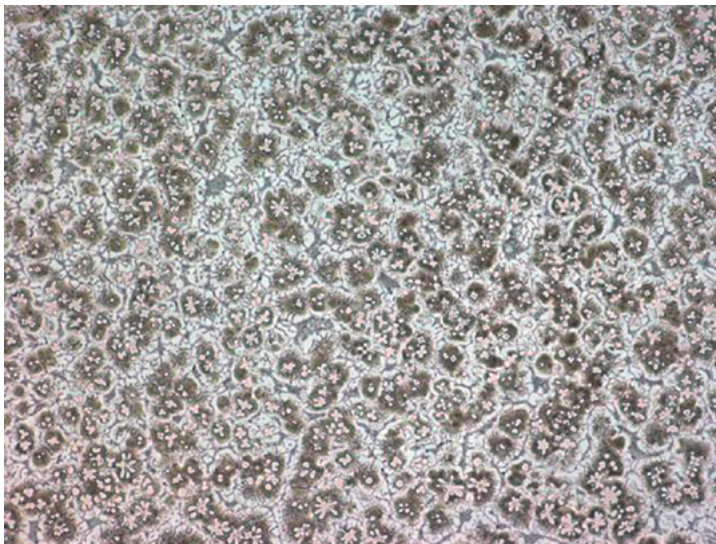
DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL												HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe	+		
FD 300	DIN EN 14700: T Fe1-300-P / DIN 8555: MF 1-300-P												280 - 325 HB	<ul style="list-style-type: none"> Tough and not sensitive to impact loads. The number of layers is not limited. Forgeable and can be additionally worked with cutting tools.
	Cable rolls, rails, couplings, back up rolls of caterpillars crane wheel rims, shafts, tool – joints, etc.													
	0.1	0.5	2	2.5	-	0.3	-	-	-	-	Bal.	Ti		
FD 310	DIN EN 14700: T Fe7-45-CPT / DIN 8555: MF 9-45-CPT												40 - 44 HRC	<ul style="list-style-type: none"> Corrosion and impact resistant, has an excellent resistance to thermal fatigue. Heat treatment is possible. Tough and can be treated with cutting tools.
	Continuous casting rolls, new cladding and rewelding of all types of hot rolling mills and caster.													
	0.2	1	1	13.5	3.5	1	-	0.2	0.15	-	Bal.	-		
FD 356	DIN EN 14700: T Fe7-40-CPT / DIN 8555: MF 9-40-CPT												40 - 42 HRC	<ul style="list-style-type: none"> Corrosion and impact resistant, has an excellent resistance to thermal fatigue. Multiple layers decrease hardness.
	Continuous casting rolls, new cladding and rewelding of all types of hot rolling mills and caster.													
	0.1	0.3	0.8	17	4.6	1.1	-	0.2	0.15	-	Bal.	-		
FD 400	DIN EN 14700: T Fe1-40-P / DIN 8555: MF 1-40-P												38 - 42 HRC	<ul style="list-style-type: none"> Low alloyed deposit for hard-facing of about 400 HB. Tough and not sensitive to impact. Forgeable, can be additionally worked with cutting tools.
	Cable rolls, rails, couplings, back up rolls of caterpillar crane wheel rims.													
	0.2	-	-	3	-	0.3	-	-	-	-	Bal.	-		
FD 450	DIN EN 14700: T Fe1-45-P / DIN 8555: MF 1-45-P												43 - 45 HRC	<ul style="list-style-type: none"> Low alloyed deposit for hard-facing of about 450 HB. Tough and not sensitive to impact. Forgeable, can be additionally worked with cutting tools.
	Cable rolls, rails, couplings, back up rolls of caterpillar crane wheel rims and shafts, etc.													
	0.2	-	-	4.5	-	0.6	-	-	0.3	-	Bal.	-		
FD 476	DIN EN 14700: T Z Fe7-50-CPT / DIN 8555: MF 9-50-CPT												48 - 50 HRC	<ul style="list-style-type: none"> High Cr- Ni- Mo- Co- V- W- alloyed flux cored wire. Specially developed for the hardfacing of rolls for hot rolling. Corrosion and wear resistant. Resistant to impact loads and continuous rating through heat fatigue and high pressure.
	Casting rolls.													
	0.3	0.3	0.8	16	4	1.5	1.5	-	1	1	Bal.	-		
FD 495	DIN EN 14700: T Z Fe8-50-CKTZW / DIN 8555: MF 3-50-CKTZ												48 - 50 HRC When hardened: 53 HRC	<ul style="list-style-type: none"> Stainless weld deposit on Fe, Cr, Co, Mo-basis. High wear resistance at elevated temperatures, high tensile strength, resistance against sliding wear of metallic objects, thermal shock resistance.
	Hardfacing of forging presses, hot piercing dies, stretching rolls, pinch rolls, hot strip mill table rolls and back-up rolls.													
	0.2	0.7	0.4	15	-	3.2	14	-	-	-	Bal.	-		

DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL											HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe		
FD 580	DIN EN 14700: T Fe3-50-PT / DIN 8555: MF 6-50-PT											48 - 52 HRC	<ul style="list-style-type: none"> Durable and abrasion resistant. Excellent thermal fatigue properties.
	Guiding rolls, scale-breaker rolls, blooming- and slabbing-mill rolls hot working tool steels.												
	0.35	0.6	2	6.5	-	1.5	-	-	0.5	1.2	Bal.		
FD 600	DIN EN 14700: T Fe3-60-PS / DIN 8555: MF 6-60-P											55 - 58 HRC	<ul style="list-style-type: none"> Flux core wire which enables a CrMoV alloyed deposit for semi automatic and automatic surfacing. Good resistance to tempering and good crack resistance.
	Parts subjected to abrasion, impact and compressive loads, sand pumps, dredge pump arms, dredge ladder rolls, etc.												
	0.5	1	3	6.5	-	0.8	-	-	0.2	-	Bal.		
FD 600 TIC	DIN EN 14700: T Fe8-60-GP / DIN 8555: MF 6-60-GP											56 - 58 HRC	<ul style="list-style-type: none"> Tough and not sensitive to impact loads. Excellent resistance a combination of impact and abrasion.
	Roller press, bucket teeth and lips, sand pumps, impellers, screws.												
	1.8	1.6	1.4	7	-	1.4	-	-	-	-	Bal.		
FD 601	DIN EN 14700: T Fe3-60-PST / DIN 8555: MF 6-60-PST											56 - 60 HRC	<ul style="list-style-type: none"> Excellent properties of resistance to abrasion and impact High heat resistance up to 550 °C
	Hammer and blooming table rolls, blowbars and bucket teeth.												
	0.5	1	3	6	-	1.6	-	-	1.5	1	Bal.		
FD 605	DIN EN 14700: T Fe20-60-GPS											55 - 60 HRC	<ul style="list-style-type: none"> Resistant against heavy abrasion and impact. High tenacity. Precipitation of fine special carbides (SC).
	Mining equipment, scraper blades for brick and clay, agriculture, fans.												
	0.5	-	-	6	-	1.3	-	-	-	-	Bal.		



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DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL												HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe	+		
FD 609	DIN EN 14700: T Z Fe6-55-CGPT / DIN 8555: MF 6-55-GPT												55 - 57 HRC	<ul style="list-style-type: none"> Ferritic-martensitic micro structure. High resistance against impact stress and medium abrasion. Crack free in multiple layers. Can be used up to 700 °C.
	Crusher wheels and hammers, rock processing shredders, cutting-tools, fluid valves and protection welding on Mn-Hadfield-steel.													
	0.5	2.8	0.8	9.5	0.3	-	-	-	-	-	Bal.	-		
FD 615	DIN EN 14700: T Z Fe8-50-CGP/ DIN 8555: MF 6-50-RPS												48 - 52 HRC	<ul style="list-style-type: none"> High chromium alloyed flux-cored wire for high wear and corrosion resistance. Rust and corrosion resistance equivalent to a 17 % Cr steel.
	Screw oil press, screw conveyors, clay industry, plastics industry.													
	0.5	-	-	17-18	0.6	1.3	-	-	-	-	Bal.	SC: 16		
FD 628	DIN EN 14700: T Z Fe6 / DIN 8555: MF 6-60-GPS												58 - 63 HRC	<ul style="list-style-type: none"> Resistant against heavy abrasion and impact Precipitation of fine special carbides (SC) Extreme hardness and high tenacity
	Mining equipment, scraper blades for brick and clay, technical knives, agriculture, fans.													
	0.6	-	-	7	-	3	-	-	-	-	Bal.	SC: 20		
FD 710	DIN EN 14700: T Z Fe13-60-GPT / DIN 8555: MF 6-65-GPT												62 - 65 HRC	<ul style="list-style-type: none"> Martensitic weld material with embedded Cr-V-Mo-carbides. High hardness and is crack resistant, further resistant to abrasive wear at medium impact, creep resistant up to 500 °C.
	Parts for crushing of minerals, dredger teeth, briquetting press tools, moulds for the ceramic/brick industry, mixing wings, feed screws, shredders, hammer mills.													
	1.4	1	1	8	-	1	-	-	1	-	Bal.	B: 1		
FD 760	DIN EN 14700: T Fe8-55-GP / DIN 8555: MF 6-55-GP												55 - 57 HRC	<ul style="list-style-type: none"> Martensitic with embedded Nb-carbides. High resistance to pressure, crack resistant. Additional resistance to abrasion wear.
	Cement and crusher rolls / hammers, briquetting plants, ceramic industry.													
	1.4	0.7	1.3	7	-	0.8	-	8	1	1.2	Bal.	-		



DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL											HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe		
FD 42	DIN EN 14700: T Fe14-45-CGT / DIN 8555: MF 10-45-CGT											41 - 44 HRC	<ul style="list-style-type: none"> Resistant to wear and corrosion. Used at any place, where corrosive and abrasive wear is expected. Hardfacing of welding material is possible without cracking. Can be additionally worked with metalloid cutting tools.
	Normally used in the meat processing and food industry for vegetable oil extrusion presses and in the chemical industry.												
	1.8	0.9	1.2	28	3	0.8	-	-	-	-	Bal.		
FD 50	DIN EN 14700: T Z Fe14-50-GP / DIN 8555: MF 10-50-GP											50 - 54 HRC	<ul style="list-style-type: none"> Resistant to abrasion and medium impact. Best results by welding in two layers. Cannot be heat treated, machined or forged.
	Excavator teeth, mixer blades, conveying screws and others.												
	3.2	1.8	1.8	15	-	-	-	-	-	-	Bal.		
FD 51	DIN EN 14700: T Z Fe14-60-G / DIN 8555: MF 10-60-G											58 - 59 HRC	<ul style="list-style-type: none"> Excellent resistance to abrasion and medium impact up to 450 °C. Best results by welding in two layers. Cannot be heat treated, machined or forged.
	Waste crushing, shredder equipments, conveyer screws, pumps, mixer parts, shovel-buckets, scrapers, fan-blades, etc.												
	4.8	0.8	0.8	21	-	-	-	-	-	-	Bal.		
FD 53 ES	DIN EN 14700: T Fe14-60-CG / DIN 8555: MF 10-60-CGT											52 - 54 HRC	<ul style="list-style-type: none"> High-alloyed flux-cored wire with high matrix hardness. High abrasion and corrosion resistance.
	Oil press screw, screw conveyors, extruder screws.												
	3.5	1.2	-	32	0.5	0.4	-	-	1	-	Bal.		
FD 55	DIN EN 14700: T Z Fe14-60-G / DIN 8555: MF 10-60-GR											55 - 59 HRC	<ul style="list-style-type: none"> Stainless weld metal with excellent resistance to abrasion and medium impact. Best results by welding in two layers. Cannot be heat treated, machined or forged.
	Piping, impellers and screws, etc.												
	4.8	1.2	0.6	29	-	-	-	-	-	-	Bal.		



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	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe		
FD 55 Mo	DIN EN 14700: T Z Fe14-60-GT / DIN 8555: MF 10-60-GT											57 - 60 HRC	<ul style="list-style-type: none"> Stainless weld metal with excellent resistance to abrasion and medium impact. Higher warm strength of the deposit in comparison to DURMAT® FD 55. Cannot be heat treated, machined or forged.
	Bucket teeth and lips, sand pumps (wet sand possible), catalyst piping, impellers and screws.												
	5	1.2	0.4	28	-	1.3	-	-	-	-	Bal.		
FD 56	DIN EN 14700: T Z Fe14-60-G / DIN 8555: MF 10-60-G											58 - 60 HRC	<ul style="list-style-type: none"> Self shielding flux cored wire. Specifically made for overlaying parts which are exposed to very extreme abrasive mineral wear related to the high amount of hard phasing. Corrosion resistant.
	Wear plates, fans, etc.												
	5.4	1	0.4	32	-	-	-	-	-	-	Bal.		
FD 56 Mo	DIN EN 14700: T Z Fe14-60-G / DIN 8555: MF 10-65-GR											60 - 64 HRC	<ul style="list-style-type: none"> High C, Cr + Mo alloyed self shielding flux core wire. Resistant to strong abrasive wear by mineral substances, rust resistant. Impact and shock sensitive.
	Wear plates, fans, etc.												
	5.3	1	-	31	-	0.7	-	-	-	-	Bal.		
FD 59	DIN EN 14700: T Fe14-60-G / DIN 8555: MF 10-60-GR											59 - 61 HRC	<ul style="list-style-type: none"> Highly C- Cr - alloyed flux-cored wire for applications in high mineral wear. Suitable for hard-facing of parts that are exposed to high abrasion in wet areas.
	Farming, gravel digger, pumps, mixer paddles, concrete pumps, conveyor screws, impeller screws, track hoppers.												
	5.0	1.2	0.4	33	-	0.5	-	-	-	-	Bal.		
FD 59 L	DIN EN 14700: T Fe14-60-CG / DIN 8555: MF 10-60-CGT											57 - 59 HRC	<ul style="list-style-type: none"> Highly C- Cr- Mo alloyed flux-cored wire for applications in high mineral wear with a corrosion resistant matrix. Hardfacing of parts that are exposed to high abrasion and minor corrosion. Crack free welding is possible.
	Kneading machines, liners, pumps, mixer parts, conveyer screws, mixer paddles, oil screws, etc.												
	3.8	1.2	-	33	-	0.5	-	-	-	-	Bal.		



DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL											HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe		
FD 59 XL	DIN EN 14700: T Z Fe14-55-CG / DIN 8555: MF 10-55-CGT											50 - 53 HRC	<ul style="list-style-type: none"> Highly C- Cr- Mo- Ni alloyed flux-cored wire for applications in high mineral wear with a corrosion resistant matrix. Hard-facing of parts that are exposed to high abrasion and minor corrosion. Crack free welding is possible.
	Kneading machines, liners, pumps, mixer parts, conveyer screws, mixer paddles, oil screws, etc.												
	3	1.3	-	32	3	0.5	-	-	-	-	Bal.		
FD 60	DIN EN 14700: T Fe15-60-G / DIN 8555: MF 10-60-G											61 - 63 HRC	<ul style="list-style-type: none"> Flux core wire for hardfacing particularly for extreme abrasive wear. Free of slag, weldability is excellent. Best results by welding in two layers. Cannot be heat treated, machined or forged.
	Parts for coal mining equipment, cement and mineral industries.												
	5.2	1.1	0.4	22	-	-	-	7	-	-	Bal.		
FD 61	DIN EN 14700: T Z Fe15-65-G / DIN 8555: MF 10-65-G											62 - 65 HRC	<ul style="list-style-type: none"> Flux core wire for hardfacing particularly for extreme abrasive wear. Free of slag, weldability is excellent. Best results by welding in two layers. Cannot be heat treated, machined or forged.
	Parts for coal mining equipment, cement and mineral industries.												
	5.2	1.3	-	22	-	-	-	7	-	-	Bal.		
FD 62	DIN EN 14700: T Z Fe15-60-G / DIN 8555: MF 10-60-G											60 - 63 HRC	<ul style="list-style-type: none"> Specifically made for verlaying parts which are exposed to very extreme abrasive mineral wear related to the high amount of hard phases.
	Wear plates, spiked rollers, cement and concrete pumps, dredging teeth, slag breakers, coke oven slides and Ni-Hard IV.												
	5.4	1.2	-	29	-	-	-	3	-	-	Bal.		
FD 64	DIN EN 14700: T Fe16-65-GZ / DIN 8555: MF 10-65-GZ											63 - 65 HRC 400 °C: 58 HRC 600 °C: 48 HRC	<ul style="list-style-type: none"> Resistant to heavy mineral abrasion at elevated temperature.
	Cement industry, mineral and brick industry, mining industry and parts subject to heavy wear in combination with temperature.												
	4.5	1.2	1.2	24	-	-	-	-	0.8	0.8	Bal.		



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DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL												HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe	+		
FD 65	DIN EN 14700: T Fe16-65-GTZ / DIN 8555: MF 10-65-GZ												63 - 65 HRC 400 °C: 62 HRC 600 °C: 59 HRC 800 °C: 53 HRC	<ul style="list-style-type: none"> Resistant to extreme abrasive wear even at elevated temperatures. Free of slag, weldability is excellent Ledeburitic structure with many different carbide types Best results by welding in two layers, can't be heat treated, machined or forged
	Blast furnace bells, coke oven screens and doors, sinter wheel breakers, smelter loading chutes, etc.													
	5.2	1	0.4	21	-	7	-	7	1	2	Bal.	-		
FD 67	DIN EN 14700: T Fe16-65-GZ / DIN 8555: MF 10-65-GZ												64 - 67 HRC	<ul style="list-style-type: none"> Designed for extreme abrasive wear and moderate impact. Free of slag. Weldability is excellent.
	Hardfacing on parts for coal mining equipment, cement and mineral industries.													
	5.4	1	0.4	21	-	-	-	-	10	-	Bal.	-		
FD 68	DIN EN 14700: T Fe16-70-CGZ / DIN 8555: MF 10-70-CGZ												66 - 68 HRC 600 °C: 60 HRC 800 °C: 54 HRC	<ul style="list-style-type: none"> Ledeburitic structure with a high amount of different hard phases. Free of slag. Resistant to extreme abrasive wear at elevated temperatures. Cannot be heat treated, machined or forged.
	Blast furnace bells, coke oven screens and doors, sinter wheel breakers, smelter loading chutes, etc.													
	5	0.8	0.4	38	-	-	-	-	-	-	Bal.	B: 2		
FD 69	DIN EN 14700: T Fe16-65-GZ / DIN 8555: MF 10-65-GRZ												64 - 67 HRC	<ul style="list-style-type: none"> Resistant to extreme abrasive wear up to 800 °C. Ledeburitic structure containing a high amount of different hard phases. Free of slag, the weldability is excellent. Best results welding in two layers. Cannot be heat-treated, machined or forged.
	Concrete industry, mixer parts, scrapers, etc.													
	5.2	0.8	0.4	32	-	-	-	5.8	-	-	Bal.	B: 1.8		
FD 70	DIN EN 14700: T Fe16-65-G / DIN 8555: MF 10-65-G												62 - 64 HRC	<ul style="list-style-type: none"> High C-, Cr-, V-alloyed flux core wire against high abrasive wear Not machinable
	Steel, coal, cement and mineral industry.													
	5.2	1	0.4	27	-	-	-	-	6	-	Bal.	-		



DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL											HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe		
FD 75	DIN EN 14700: T Fe16-65-GZ / DIN 8555: MF 10-65-GZ											62 - 64 HRC 400 °C: 61 HRC 600 °C: 58 HRC 700 °C: 55 HRC	<ul style="list-style-type: none"> High C-, Cr-, Nb-, Mo-, W-, V-alloyed flux-cored wire electrode for mineral wear and use at higher temperatures. Hardness reduction at a temperature of 400 °C is approximately 6 % and at 600 °C approximately 10 %.
	Slag conveyer screws, hot sinter breaker.												
	5.2	1.2	0.6	22	-	4.5	-	6.4	0.8	1.4	Bal.		
FD 78	DIN EN 14700:T Fe16-70-G / DIN 8555: MF 10-70-G											64 - 68 HRC	<ul style="list-style-type: none"> C-, Cr-, V-, Nb-alloyed flux core wire against extreme mineral wear. High scratch hardness. Best results by welding in two layers. Cannot be heat-treated, machined or forged.
	Sinter plants, lignite mining machines, gravel industry, chains, clinker industry, concrete pumps.												
	5	1.3	0.5	16	-	-	-	6.5	6.5	-	Bal.		
FD 79	DIN EN 14700: T Fe16-70-G / DIN 8555: MF 10-70-G											64 - 68 HRC	<ul style="list-style-type: none"> Resistant to abrasion by the highest mineral wear. Slag-free with excellent weldability.
	Sand and concrete pumps, mixer blades, mixers, screw conveyors, mining, cement industry, mineral processing and waste breakers.												
	5	1	-	21	-	-	-	6	2.5	-	Bal.		
FD 164	DIN EN 14700: T Fe14-60-CG / DIN 8555: MF 10-65-GR											60 - 64 HRC	<ul style="list-style-type: none"> Suitable for application to parts subject to severe abrasive wear with exposed mineral substances. Resistant corrosion.
	Wear plates, fans, machinable, NI-Hard IV, etc.												
	5.3	1.2	-	28	-	-	-	-	-	-	-		
FD 720	DIN EN 14700: T Fe13-65-G											64 - 66 HRC	<ul style="list-style-type: none"> Low alloyed flux core wire. Suitable for parts subject to impact, metal to metal friction and severe fine particle abrasion and erosion load.
	Dredges, concrete pumps, driving screws, fine particle wearing parts.												
	0.7	1	2	-	2	-	-	-	-	-	Bal.		



DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL												HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe	+		
FD 721	DIN EN 14700: T Z Fe8												64 - 66 HRC	<ul style="list-style-type: none"> Flux cored wire with alloyed Fe-B-Cr-weld metal with a martensitic carbide structure. Suitable for highly abrasion resistant hardfacings that are exposed to minor impact and high wear at temperatures of up to 450 °C.
	Feed screws, sand preparation plants, wear plates, ceramic industry													
	1.5	1	2	16	-	-	-	-	-	-	Bal.	B: 3.5		
FD 733	DIN EN 14700: T Z Fe12-70-G / DIN 8555: MF 10-70-GT												66 - 68 HRC	<ul style="list-style-type: none"> Contains very fine grained extremely hard chrome-carbides and niobium-carbides. Suitable for hardfacing on parts requiring high abrasion resistance, minor impact resistance and wear resistance up to a working temperature of approx. 450 °C.
	Parts with high abrasive and erosive load superposed by corrosive attack.													
	3.5	1	1	18	-	-	-	4	-	-	Bal.	B: 1.4		
FD 739	DIN EN 14700: T Fe16-70-CG												67 - 70 HRC	<ul style="list-style-type: none"> Iron based flux cored wire containing complex carbide phases which are precipitated more fine than in common used hardfacings. Better resistance against abrasive and erosive load.
	Parts with high abrasive and erosive load superposed by corrosive attack.													
	1	-	-	20	-	3.3	-	3.4	-	5.7	Bal.	B: 4.4		
FD 740	DIN EN 14700: T Fe16-65-CG												65 - 68 HRC	<ul style="list-style-type: none"> Parts with high abrasive and erosive load superposed by corrosive attack.
	Auf Bauteilen mit hoher abrasiver und erosiver Belastung, die durch korrosive Beanspruchung überlagert werden kann.													
	1	-	-	20	-	3.3	-	-	-	5.7	Bal.	B: 4.4		



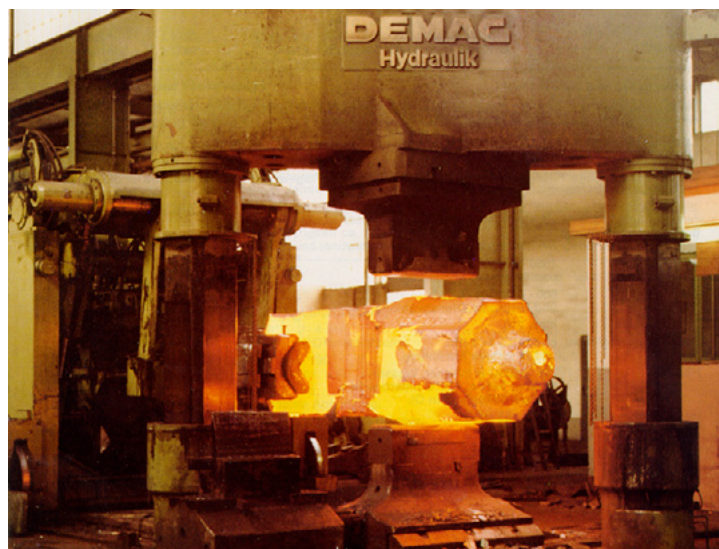
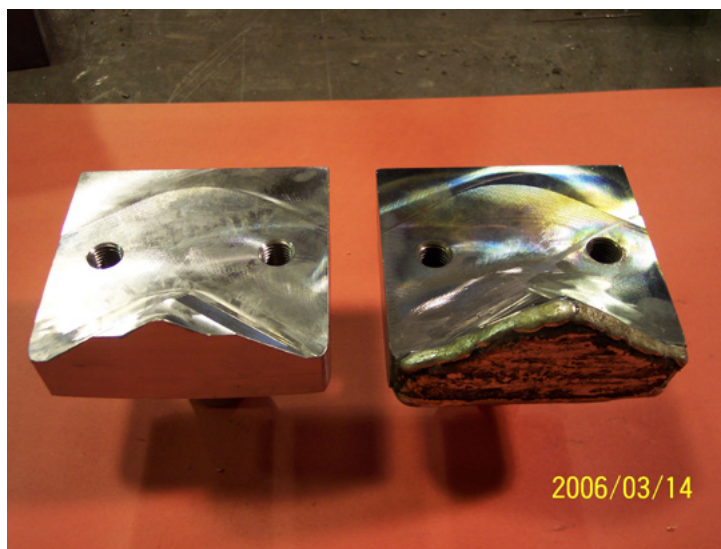
DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL												HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe	+		
FD 812	Special alloy												38 - 44 HRC	<ul style="list-style-type: none"> Thermal shock resistant. Highly heat resistant. Tensile strength: 1200 - 1400 N/mm².
	Repair of drop-forge dies.													
	0.1	0.5	0.6	10	1	2	-	-	-	-	bal.	Ti: 0.2		
FD 813	Special alloy												41 - 47 HRC	<ul style="list-style-type: none"> Thermal shock resistant. Highly heat resistant. Tensile strength: 1300 - 1500 N/mm².
	Repair of drop-forge dies.													
	0.12	0.6	0.6	10	1.7	3	-	-	-	-	bal.	Ti: 0.2		
FD 814	Special alloy												44 - 48 HRC	<ul style="list-style-type: none"> Thermal shock resistant. Highly heat resistant. Tensile strength: 1400 - 1600 N/mm².
	Repair of drop-forge dies.													
	0.2	0.6	0.6	10	1.7	3	-	-	-	-	bal.	Ti: 0.2		
FD 816	Special alloy												48 - 53 HRC	<ul style="list-style-type: none"> Thermal shock resistant. Highly heat resistant. Tensile strength: 1600 - 1800 N/mm².
	Repair of drop-forge dies.													
	0.28	0.7	0.6	10	1.7	3	-	-	0.2	-	bal.	Ti: 0.2		
FD 818	Special alloy												52 - 55 HRC	<ul style="list-style-type: none"> Thermal shock resistant. Highly heat resistant. Tensile strength: 1800 - 2000 N/mm².
	Repair of drop-forge dies.													
	0.36	0.7	0.6	10	1.7	3	-	-	0.3	2	bal.	Ti: 0.2		



DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL												HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe	+		
FD 862	Special alloy												34 - 40 HRC	<ul style="list-style-type: none"> • Thermal shock resistant. • Highly heat resistant. • Tensile strength: 1100 - 1300 N/mm².
	Repair of drop-forge dies.													
	0.15	0.7	0.6	4.5	-	1	-	-	0.2	1	bal.	-		
FD 864	Special alloy												44 - 48 HRC	<ul style="list-style-type: none"> • Thermal shock resistant. • Highly heat resistant. • Tensile strength: 1400 - 1600 N/mm².
	Repair of drop-forge dies.													
	0.25	0.7	0.6	5	-	1.5	-	-	0.4	1.4	bal.	Ti: 0.2		
FD 866	Special alloy												48 - 52 HRC	<ul style="list-style-type: none"> • Thermal shock resistant. • Highly heat resistant. • Tensile strength: 1600 - 1800 N/mm².
	Repair of drop-forge dies.													
	0.3	0.7	0.6	5.5	-	2.5	-	-	0.6	2.4	bal.	Ti: 0.2		
FD 868	Special alloy												52 - 55 HRC	<ul style="list-style-type: none"> • Thermal shock resistant. • Highly heat resistant. • Tensile strength: 1800 - 2000 N/mm².
	Repair of drop-forge dies.													
	0.4	0.8	0.6	6	-	3	-	-	0.7	3	bal.	Ti: 0.2		



DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL												HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe	+		
FD WZ 50 1.2567	DIN EN 14700: T Fe3-50-STW / DIN 8555: MF 3-50-ST												48 - 50 HRC After heat treatment: 50 - 52 HRC	<ul style="list-style-type: none"> • C-Cr-V-W-alloyed flux core wire. • Suitable for repair and build-up applications on hot working steels of Similar to or lower alloyed hot working tools, machinable. Retention of hardness up to 550 °C.
	Slab shears, hot-forging dies, hot shear blades, drawing dies, crushing equipment and depressions created by forging, pressure and impact stress.													
	0.3	0.6	0.4	3	-	-	-	-	0.6	4.5	bal.	-		
FD WZ 55 ~1.2662	DIN EN 14700: T Fe3-55-STW / DIN 8555: MF 3-50-ST												53 - 56 HRC After heat treatment: 57 - 59 HRC	<ul style="list-style-type: none"> • Air hardening and wear resistant alloy. • Can be applied to reclaim hot-forging dies and to overlay the edges and flat areas of low alloyed high density steel tools.
	Slab shears, hot-forging dies, hot shear blades, drawing dies, crushing equipment and depressions created by forging, pressure and impact stress.													
	0.35	0.8	1.2	3	-	-	2	-	0.5	7	bal.	-		
FD WZ 59	DIN EN 14700: T Z Fe4-55-ST / DIN 8555: MF 4-55-ST												57 - 59 HRC	<ul style="list-style-type: none"> • Wear and heat resistant. • Retention of hardness up to 550 °C.
	Suitable for repair and manufacture of hot and cold working tools, stamps and counter dies, etc.													
	0.6	0.6	-	5	-	3.5	-	-	-	3.5	bal.	-		
FD WZ 60 1.3346	DIN EN 14700: T Fe4-60-ST / DIN 8555: MF 4-60-ST												After air cooling: 58 - 60 HRC	<ul style="list-style-type: none"> • Air hardening and wear resistant alloy. • Can be applied as high-temperature wear resistant hardfacing on low alloyed high density steel tools.
	New and repair hardfacing on plungers, dies, forging dies, press mandrils.													
	0.8	0.6	0.4	4.5	-	8	-	-	1.5	2	bal.	-		
FD WZ 6356 1.6356	Special Alloy												41 - 43 HRC After heat treatment: 53 - 56 HRC	<ul style="list-style-type: none"> • Hardness increase by artificial aging.
	Al-diecasting mold, Al-edge tools and shearing tools.													
	0.03	-	-	-	18	4	12	-	-	-	-	Ti+		

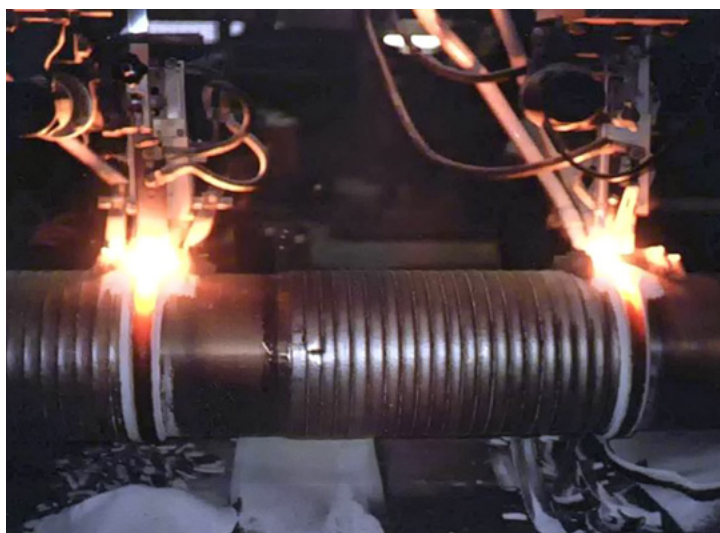


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DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL												HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe	+		
FD NiFe36 1.3912	Special alloy												≈160 HB	<ul style="list-style-type: none"> Flux cored wire electrode for welding cast iron, joining steel and cast iron and cast cavity welding. Extremely low coefficient of thermal expansion. Machinable.
	Joint welding and repair welding of cast iron, centrifugally cast, malleable cast iron etc.													
	0.1	1	3	-	36	-	-	-	-	-	bal.	-		
DUROLOY NiFe 60/40	Special alloy												160 - 190 HB	<ul style="list-style-type: none"> Nickel alloyed iron based tubular wire. Suitable for grey cast iron parts and spherulitic cast iron. Machinable.
	Joining and repairing on nearly all types of cast iron													
	< 0.5	< 1	4	-	bal.	-	-	-	-	-	40	Cu +		

DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL												HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe	+		
FD CROMO 1	DIN EN 14700: T Fe1-300-P / DIN 8555: MF 1-300-P												280 HV ₃₀ Tensile strength: ≈ 680 N/mm ²	<ul style="list-style-type: none"> Suitable for medium alloyed steels, that are considered to be hard to weld; for high tensile steel, heat treatable hard-facing and designed for build up welding on worn-out parts. Very high crack resistance, highly resistant against impact and pressure wear.
	Tool steel, armour steel, crane pulley wheels, transport-rollers, moulds or dies, built up welding.													
	0,1	0,5	1	1,3	-	0,6	-	-	-	-	bal.	-		
FD CROMO 2	DIN EN 14700: T Fe1-350-P / DIN 8555: MF 1-350-P												≈ 300 HV ₃₀ Tensile strength: ≈ 700 N/mm ²	<ul style="list-style-type: none"> Suitable for medium alloyed steels, that are considered to be hard to weld; for high tensile steel, heat treatable hard-facing and designed for build up welding on worn-out parts. Very high crack resistance, highly resistant against impact and pressure wear.
	Tool steel, armour steel, crane pulley wheels, transport-rollers, mould or dies, built-up welding.													
	0,10	0,4	1,2	2,4	-	0,8	-	-	-	-	bal.	-		
FD NiCrMo 2.2	DIN EN 14700: T Fe13-300-P / DIN 8555: MF 1-350-P												280 - 320 HV ₃₀ Tensile strength: 900 - 960 N/mm ²	<ul style="list-style-type: none"> Flux cored wire, suitable for medium alloyed steels and high strength steels. Can be used as a buffer and build-up layer. Highly crack resistant and is highly resistant to impact and pressure wear.
	Build-up layers for carbon steels, buffer layers for continuous casting rolls and cement rolls.													
	0,06	-	1,6	0,4	2,2	0,4	-	-	-	-	bal.	Ti+		

DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL											HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe		
FD 310 UP	DIN EN 14700: T Fe7-45-CPT / DIN 8555: MF 5-45-PRT											42 - 44 HRC	<ul style="list-style-type: none"> Corrosion and impact load resistant. Excellent resistance to thermal fatigue. Heat treatment is possible. Tough and can be worked with cutting tools.
	Continuous casting rolls.												
	0.10	0.7	2	13.8	3.5	1.1	-	0.2	0.2	-	bal.		
FD 328 UP	DIN EN 14700: Fe Z1-300-PT / DIN 8555: MF 5-300-PT											280 - 325 HB	<ul style="list-style-type: none"> Alloy cored wire for submerged arc. Suitable for operating temperatures up to 550 °C.
	Slabbing rolls, bar mill rolls.												
	0.08	0.4	0.8	6	-	0.7	-	-	-	-	bal.		
FD 337 UP	DIN EN 14700: Fe3-50-PT / DIN 8555: MF 5-50-PT											52 - 54 HRC	<ul style="list-style-type: none"> Flux cored wire for the submerged arc process. Resistant against high pressure and abrasion also an excellent resistance to high thermal fatigue.
	Back-up rolls, pinch rolls, plate-mill leveler, slabbing-mill rolls, edger rolls, looper-tension rolls.												
	0.33	0.4	1.2	5.6	0.3	3.3	-	-	0.25	-	bal.		
FD 341 UP	DIN EN 14700: T Fe13-300-P / DIN 8555: MF 1-300-P											300 - 340 HB Tensile strength: ≈ 1200 N/mm ²	<ul style="list-style-type: none"> Flux cored wire, suitable for medium alloyed steels and high strength steels. Can also be used as a buffer and build-up layer. Highly crack resistant and is highly resistant to impact and pressure wear.
	Build-up layers for carbon steels, buffer layers for continuous casting rolls and cement rolls.												
	0.12	0.4	1.6	2.5	0.5	2.5	-	-	0.4	-	bal.		
FD 356 UP	DIN EN 14700: T Fe7-40-CPT / DIN 8555: MF 5-40-CPT											42 - 44 HRC	<ul style="list-style-type: none"> Resistant against corrosion, impact, continuous-rating wear in addition to effect of heat. Best results are achieved by 2 - 3 layers.
	Continuous casting rolls.												
	0.05	0.4	1.2	17	4.6	1.1	-	0.2	0.25	-	bal.		



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DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL											HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe		
FD 4351 UP 1.4351	DIN EN 14700: T Z Fe7-45-CPT / DIN 8555: MF 5-45-PRT											38 - 42 HRC	<ul style="list-style-type: none"> • Good corrosion resistance. • Very good resistance to cavitation and erosion. • Thermal shock resistant. • High-pressure resistant in continuous exposure to heat.
	Wear stressed components of seawater- and power plants, as well as in the food and paper industry. Water turbines, continuous casting rolls in the steel industry.												
	0.05	0.4	1	14	5	0.75	-	-	-	-	bal.		
FD 440 UP	DIN EN 14700: T Fe7-450-CPT / DIN 8555: MF 5-450-PRT											500 HB 500 °C: 480 HB 600 °C: 300 HB	<ul style="list-style-type: none"> • Flux cored wire for submerged arc welding. • Resistant against impact and medium abrasive wear. • Resistant against corrosion and continuous rating through heat effect.
	Hot strip mill table rolls, pinch rolls, continuous casting rolls, continuous billet.												
	0.3	0.4	1.0	13	2.4	1.5	-	-	1	-	bal.		
FD 476 UP	DIN EN 14700: T Fe7-50-CPT / DIN 8555: MF 5-450-PRT											48 - 50 HRC	<ul style="list-style-type: none"> • Flux cored wire for submerged arc welding. • Corrosion resistant and wear resistant. • Resistant against impact and continuous rating through heat effect and high pressure.
	Steel mill rolls, hardfacing of rolls for hot rolling.												
	0.3	0.4	1.4	16	4	1.5	1.5	-	1	1	bal.		
FD 502 UP	DIN EN 14700: T Fe8-50-CPT / DIN 8555: MF 6-50-PRT											48 - 52 HRC Hot hardness 530 - 540 °C: 54 HRC	<ul style="list-style-type: none"> • Flux cored wire for the submerged arc welding process. • Excellent for components subjected to metal-to-metal wear, corrosion and thermal fatigue cracking.
	Continuous casting rolls and other steel mill rolls as scale breaker rolls, hot strip mill rolls, furnace rolls.												
	0.3	-	-	13	-	1.5	2	-	2	1.2	bal.		



DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL												HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe	+		
FD 4009 1.4009	DIN EN 14700: / DIN 8555: T Fe8-300-CP / AWS-Nr. 410												300 - 360 HB	<ul style="list-style-type: none"> Tough and corrosion resistant, acid resistant Suited for parts that encounter wear from sea water plant and power plant operations Service temperatures up to 450 °C
	Bridge bearings, corrosion slide ring sealing, roller bearings, valves, continuous casting rolls, Cr- alloying buffer layers.													
	0.12	0.8	1.2	14.5	+	-	-	-	-	-	bal.	Ti+		
FD 4015 1.4015	DIN EN 14700: T Z Fe8-250-CP / DIN 8555: MF 5-250-CP / AWS-Nr. 430												220 - 240 HB	<ul style="list-style-type: none"> Flux cored wire for the Open-Arc welding process (available as MIG-wire) Stainless, corrosion resistant against sea water, organic and inorganic acids Suitable for joining of Similar to materials
	Sealing surfaces, fittings for water, steam and gas fittings, bridge bearings, continuous casting rolls, roller bearings, valves.													
	0.08	0.8	1.2	17.5	-	-	-	-	-	-	bal.	-		
FD 4028 1.4028	DIN EN 14700: T Z Fe8-50-CGPT / DIN 8555: MF6-50-CGPT / AWS-Nr. 420												46 - 48 HRC	<ul style="list-style-type: none"> Tough and stainless alloy. Resistant to corrosion in seawater and dilute organic and inorganic acids.
	Connection of similar type materials, coating of different species; bridge bearings, sealing surface armor, slip rings, guide bearings, valves, centrifuges, etc.													
	0.3	0.8	1.2	14	0.4	-	-	-	-	-	bal.	-		
FD 4115 1.4115	DIN EN 14700: T Fe8-40-CP / DIN 8555: MF 6-40-CP												42 - 44 HRC	<ul style="list-style-type: none"> Tough and corrosion resistant. Suited for parts that encounter wear from sea water plant and power plant operations. Suited for sliding wear (metal on metal).
	Sealing surface of water-, steam- and gas armatures up to service temperatures of 450 °C.													
	0.2	0.8	1.2	17	0.4	1	-	-	-	-	bal.	-		
FD 4122 1.4122	DIN EN 14700: T Fe8-50-CP / DIN 8555: MF 6-50-CP												48 - 51 HRC	<ul style="list-style-type: none"> Tough and corrosion resistant. Suited for parts that encounter wear from sea water plant and power plant operations. Suited for sliding wear (metal on metal).
	Bridge bearings, sealing surfaces, corrosion slide ring sealing, roller bearings, valves, continuous casting rolls.													
	0.4	0.8	1.2	17	0.4	1	-	-	+	-	bal.	-		
FD 4122 Nb	DIN EN 14700: T Z Fe8-50-CGP / DIN 8555: MF 6-50-CGPT												48 - 51 HRC	<ul style="list-style-type: none"> Flux cored wire for the Open-Arc welding process (available as MIG-wire). Corrosion resistant against sea water. Good wear resistance.
	Sealing surface of water, steam and gas armatures.													
	1.2	0.8	1.2	17	1	-	-	8	0.3	-	bal.	-		
FD 4351 N OA 1.4351	DIN EN 14700: T Z Fe7-45-CPT / DIN 8555: MF 5-45-PRT / AWS-Nr. 410 NiMo												38 - 42 HRC	<ul style="list-style-type: none"> Flux cored wire for open arc welding (available as MIG-wire). Tough and corrosion resistant, suited for parts that encounter wear from oxidation. Capable of resisting pitting and cavitation.
	Continuous casting rolls, roller bearings, corrosion, valves, bridge bearings.													
	0.05	0.9	1.1	14	5	0.75	-	-	-	-	bal.	N+		

DURMAT® cobalt base hard alloys are mostly produced from the Co-Cr-W-C system, which was originally intended for cutting tools. Within these alloys, the metal matrix shows a Co-Cr-W-mixed crystal that may contain precipitated WC as well since the solubility of WC reduces with rising temperature. This way, metal matrices have micro-hardnesses of up to 450 HV_{0.05}. Cold hardening can even achieve structure strengths of up to 650 HV_{0.05}.

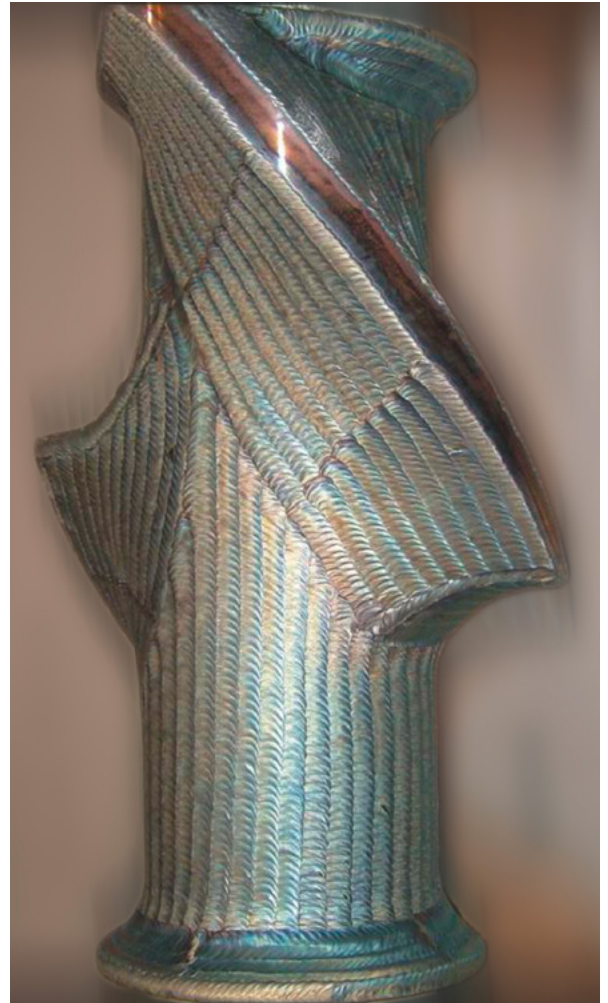
Cobalt base hard alloys tend to cold-harden due to their intrinsically low stacking fault energy that facilitates the planar and transverse sliding of offsets and thus gives the structure a high (creepage) strength. Such deformation mechanisms can permit these alloys to harden very quickly while at the same time ensuring good resistance against friction wear.

The carbide-containing cobalt base alloys all have a high chrome ratio that tends to form a passive layer on the surface, similar to that of stainless steel. This phenomenon gives these alloys a good corrosion resistance, in particular in oxidising environments. The molybdenum-containing DURMAT® cobalt base hard alloys (e.g. DURROLIT 21) have been developed specifically for further improving corrosion resistance in reducing and complex atmospheres.

Furthermore, precipitation hardening through intermetallic phases is of high importance for cobalt base hard alloys. With the corresponding contents of tungsten and molybdenum, intermetallic phases of the Co₃(W, Mo) type may precipitate after solution annealing. Therefore, such metal matrices are in the best case suitable even for applications at up to 1,000 °C, since the strength loss due to over-aging is low.

A further contribution to solidification of cobalt is the allotropic phase transformation: Cobalt has a face-centred cubic lattice structure (fcc) at high temperatures (> 417 °C) and transforms to a hexagonal close-packed lattice structure (hcp) during cooling. However, this conversion is so slow that a metastable fcc-phase in the weld metal occurs. This fcc-phase at its turn can be transformed into the hcp-structure by special processes. This phase transformation as well as the low stacking fault energy give cobalt base alloys unique wear properties, especially with regard to sliding abrasion and fretting.

DURMAT® Cobalt base hard alloys may be used together with many base materials, such as carbon steels, un- and low-alloyed steels or stainless steels. Pre-heating is often necessary to ensure crack-free application. A buffer layer with DURMAT® FD 250K is recommended at multiple-layer welds.



DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL											HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe		
DUROLIT 1	DIN EN 14700: T Co3 / DIN 8555: MF 20-55-CGTZ / AWS 5.21 - ERC CoCrC											55 HRC 600 °C: 44 HRC 800 °C: 34 HRC	<ul style="list-style-type: none"> Austenitic-ledeburitic structure. Great resistance to corrosion, reducing acids, impact, extreme wear and temperature shocks Only machinable by grinding. Tensile strength: 630 N/mm².
	Wear pads, rotary seal rings, pump sleeves; centre less grinder work rests, etc.												
	2.4	0.7	0.4	29	-	-	bal.	-	-	12	< 4		
DUROLIT 6	DIN EN 14700: T Co2 / DIN 8555: MF 20-45-CTZ / AWS 5.21 - ERC CoCrA											40 - 43 HRC 300 °C: 35 HRC 600 °C: 29 HRC	<ul style="list-style-type: none"> Austenitic-ledeburitic structure. Great resistance to corrosion, reducing acids, impact, extreme wear and temperature shocks. Machinable by hard faced tools. Tensile strength: 900 N/mm².
	Steam and chemical valves, equipment handling hot steel such as tong bits, shear blades, pumps for high temperature liquids, etc.												
	1.1	1	0.6	27	-	-	bal.	-	-	4.5	< 4		
DUROLIT 6 LC	DIN EN 14700: T Co2 / DIN 8555: MF 20-40-CTZ											36 - 39 HRC	<ul style="list-style-type: none"> Austenitic structure bearing chrome and tungsten carbides. Resistant to high corrosion and abrasion, high impact stress and extreme temperature shocks. Machinable by hard metal tools.
	Abrasion, erosion, corrosion, cavitation at high temperatures, pumps, extrusion screws, bearing surfaces, chemical industry, hot shear blades, valves, etc.												
	0.8	1	0.8	28	-	-	bal.	-	-	4.5	< 4		
DUROLIT 6 HC	DIN EN 14700: T Co2 / DIN 8555: MF 20-45-CTZ											43 - 46 HRC	<ul style="list-style-type: none"> Austenitic structure bearing chrome and tungsten carbides. Resistant to high corrosion and abrasion, high impact stress and extreme temperature shocks. Machinable by hard metal tools.
	Steam and chemical valves, equipment handling hot steel such as tong bits, shear blades, pumps for high temperature liquids, etc.												
	1.3	1	0.8	29	-	-	bal.	-	-	4.5	< 3		
DUROLIT 12	DIN EN 14700: T Co3 / DIN 8555: MF 20-50 CTZ / AWS 5.21 - ERC CoCrB											45 - 48 HRC 300 °C: 37 HRC 600 °C: 32 HRC	<ul style="list-style-type: none"> Austenitic-ledeburitic structure. Improved wear resistance compared to DUROLIT 6, used for applications exposed to reduced mechanical shock. Machinable by hard faced tools. Tensile strength: 850 N/mm².
	Cutting edges of long knives and other tools used in the wood, plastic, paper, carpet and chemical industry, etc.												
	1.4	0.8	0.6	29	-	-	bal.	-	-	8	< 3		
DUROLIT 21	DIN EN 14700: T Co1 / DIN 8555: MF 20-350-CKTZ / AWS 5.21 - ERC CoCrE											30 HRC After work hardening: 45 HRC	<ul style="list-style-type: none"> Cobalt alloy with the highest corrosion and thermal resistance of all cobalt-base alloys Machinable.
	Components which are exposed to high temperatures, corrosion and impact stress, such as valve seats, components in the chemical industry.												
	0.25	0.8	0.8	27	2.5	5.5	bal.	-	-	-	< 4		
DUROLIT 25	DIN EN 14700: T Z Co1 / DIN 8555: MF 20-300-CKTZ											250 - 280 HB	<ul style="list-style-type: none"> Contains approximately 10.5 % nickel for matrix stability during elevated temperature service. Resistant to hot corrosion, impact, wear and extreme temperature shocks and oxidation. Machinable by hard faced tools.
	Hot forging tools, turbo charger buckets, parts subject to high operating temperatures with all types of wear such as impact, pressure, corrosion, erosion.												
	0.1	0.5	0.1	20	10	-	bal.	-	-	15	< 4		

DURMAT® FD SER are Iron-based Flux-cored Wires, with the deposit located in the low levelled brittle phase. The deposit is also suitable for heat-hardening. This gives the deposit similar wear resistant properties as the Cobalt-based special alloys in that they have excellent abrasive wear at high temperatures. This wires are ideal as a substitute alloy when Cobalt-based alloys are not useable, for example in the nuclear industry or when surface cracking is to be limited:

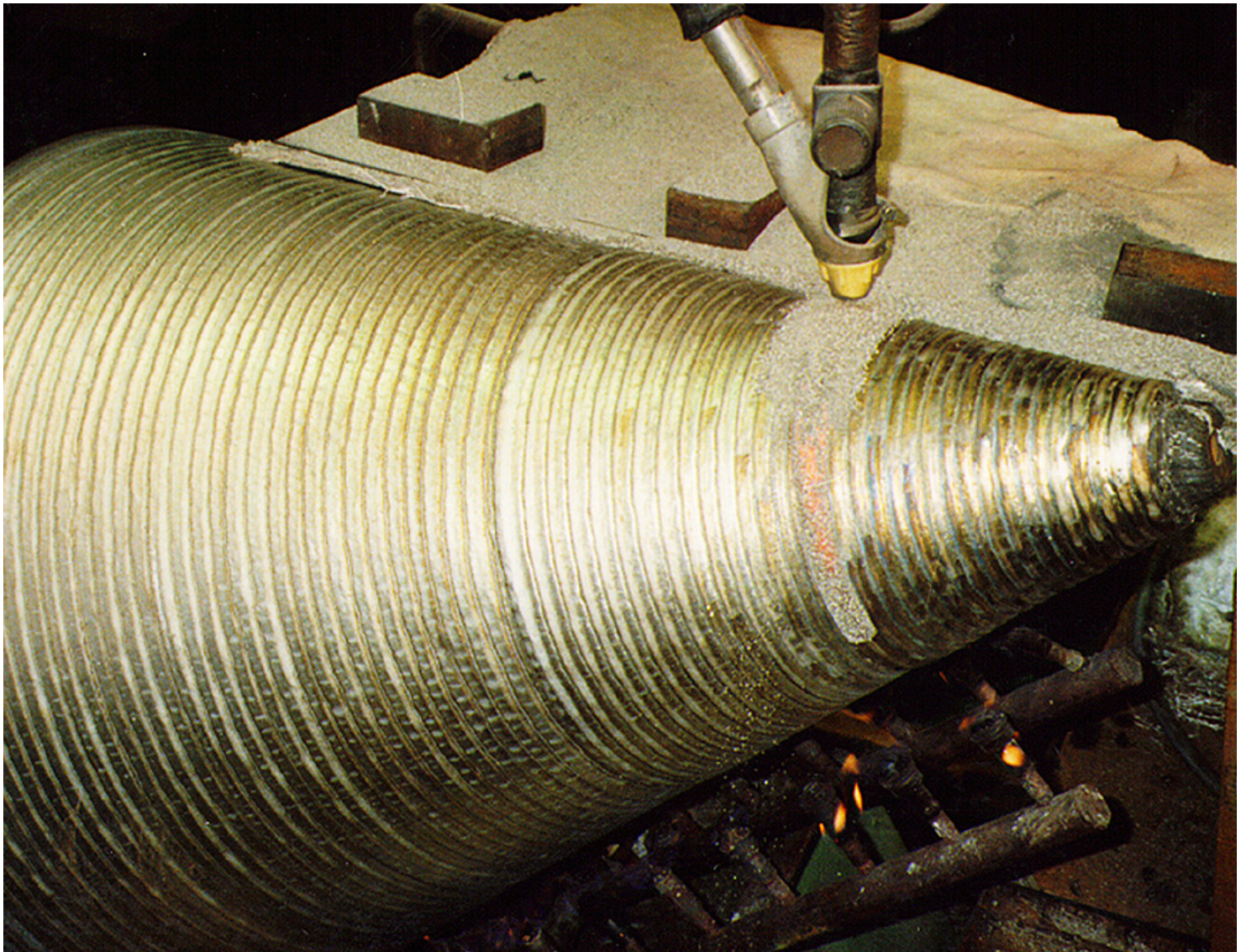
- With DURMAT® DUROLIT alloys comparable properties;
- Ferritic-austenitic microstructure;
- High content of ferrite and ETA phases;
- Cavitation, corrosion, erosion resistant;
- Impact and thermal shock resistant;
- Heat resistant up to 600 °C.

DURMAT®	TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL										HARDNESS
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	Fe	
SER 1	0.06 - 0.08	5.0	5.5	18.5	8.5	5.0	-	1	0.2	Bal	50 - 56 HRC
SER 6	0.06 - 0.08	4	5	18.5	8.5	4.0	-	1	0.2	Bal	40 - 44 HRC
SER 12	0.06 - 0.08	4.5	5	18.5	8.5	4.5	-	1	0.2	Bal	45 - 50 HRC
SER 21	0.06 - 0.08	3.5	5	18.5	9	3	-	1	0.2	Bal	280 - 350 HV
SER 290	0.06 - 0.08	5.5	2	18	8.5	1.0	-	-	-	Bal	290 HV

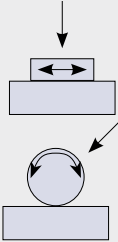

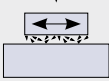
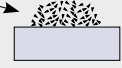



DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL												HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe	+		
DUROLOY 520W	DIN EN 14700: T Ni2-40-CKPTZ / DIN 8555: MF 23-40-CKPTZ												32 - 35 HRC After work hardening: 45 HRC	<ul style="list-style-type: none"> CrCoMoTiAlW-alloyed nickel based weld metal. Precipitation hardenable alloy with an exceptional combination of high temperature mechanical property, forgeability and corrosion resistance. Crack free.
	Critical high temperature applications like hot forging dies or hot shear blades.													
	0.05	-	-	19	bal.	6	10	-	0.3	5	-	Ti: 3 Al: 2		
DUROLOY 521 W	DIN EN 14700: T Ni2-40-CKPTZ / DIN 8555: MF 23-40-CKPTZ												220 HB	<ul style="list-style-type: none"> High-temperature hardness and heat resistance. Good corrosion resistance and wear resistance.
	Armor of hammer saddles													
	0.06	-	-	19	bal.	6	11.5	-	-	0.8	-	Ti: 3 Al: 2		
DUROLOY 625 2.4621	Ni Cr 20 Mo 9 Nb / E Ni Cr Mo 3													<ul style="list-style-type: none"> Ni- based flux cored wire for the shielded gas welding application. High resistance against many corrosive mediums, pittings, tension cracking and gap corrosion, high scaling resistance and heat hardening treatment.
	Chemical industry, furnace parts. Also suitable in freezing temperatures as well as cold hardened metals.													
	0.05	0.3	0.5	22	bal.	9	-	3.5	-	-	<3	-		
DUROLOY CO 2.4687	DIN EN 14700: T Ni2-250-CKNPT / DIN 8555: MF 23-250-CKNPTZ												260 - 280 HB After work hardening: 420 HB	<ul style="list-style-type: none"> Applied by shielded arc welding, resulting in a heat and wear resistant hard-facing. Resistant to oxidation, reduction and other corrosive media. High resistance to impact and pressure load and even at elevated temperature.
	Hardfacing on forging dies and other hot working tools.													
	0.08	-	-	16	bal.	16	2.5	-	0.3	4.5	<5	-		
DUROLOY SE 1/58	DIN EN 14700: T Ni1-60CGTZ / DIN 8555: MF 22-60-CGTZ												58 - 62 HRC	<ul style="list-style-type: none"> Nickel based alloy deposit with properties like those of its Stellite counterpart with good hardness, heat resistance, temperature shock resistance, corrosion and wear resistance.
	Chemical, automobile and food industry along with nuclear technology.													
	0.75	4.7	-	20	bal.	-	-	-	-	-	<5	B: 3.2		
DUROLOY SE 6/40	DIN EN 14700: T Ni1-40CGTZ / DIN 8555: MF 22-40-CGTZ												41 - 43 HRC	<ul style="list-style-type: none"> Flux core wire for oxy-acetylene, WIG or MIG welding. Hot hardness, temperature shock resistance and corrosion and wear resistance.
	Chemical, automobile and food industry along with nuclear technology.													
	0.4	4.5	-	22	bal.	-	-	-	-	2	<5	B: 1.4		
DUROLOY SE 12/50	DIN EN 14700: Ti Ni1-50ZGTC / DIN 8555: MF 22-50-CGTZ												48 - 52 HRC	<ul style="list-style-type: none"> High hot hardness, corrosion resistance, heat resistance, wear resistance and thermal shock constancy.
	Chemical industry, nuclear technology field, etc.													
	0.6	4.9	-	21	bal.	2.5	-	-	-	-	<5	B: 2.8		

DURMAT®	CLASSIFICATION TYPICAL APPLICATIONS TYPICAL CHEMICAL COMPOSITION* (Wt.-%) OF WELD METAL												HARDNESS	TYPICAL PROPERTIES
	C	Si	Mn	Cr	Ni	Mo	Co	Nb	V	W	Fe	+		
DUROLOY SE 21/35	DIN EN 14700: T Ni1-35-CGTZ / DIN 8555: MF 22-35-CGTZ												34 - 36 HRC	<ul style="list-style-type: none"> High hot hardness, corrosion resistance, heat resistance, wear resistance and thermal shock constancy.
	Chemical, automobile and food industries along with nuclear technology.													
	0.35	4.5	-	20	bal.	-	-	-	-	-	2	<4		
DUROLOY SE 56	DIN EN 14700: T Ni 1-55CGTZ / DIN 8555: MF 22-55-CGTZ												55 - 58 HRC	<ul style="list-style-type: none"> High hot hardness, corrosion resistance, heat resistance, wear resistance and thermal shock constancy.
	Oil press screw, chemical industry.													
	0.65	4.6	0.2	21	bal.	2.5	-	-	-	-	-	-		



Help Information

SYSTEM STRUCTURE	WEAR CHARACTER	COMPONENT EXAMPLE	ALLOY*	ALLOY**
Solid body - solid body Solid body - friction Dry friction Mixed friction 	Sliding wear	Guide way, slide bar	Fe1, Fe2, Fe3, Cu1	A, B, C, T
	Impingent wear	Sledge hammer	Fe9, Fe10, Al1, Ni2, Ni4	G, H, S
	Impact wear	Rocker level, cams	Fe1, Fe2, Fe3	A, B, C
	Rolling wear	Tram rail	Fe9, Fe10	G, H
	Ball bearing wear	Rotor	Fe1, Fe2, Fe3, Fe9	A, B, C, G
	Rolling impact wear	Casting guidance roller	Fe7	E
	Thermal shock	Roller conveyor roll	Fe3, Fe6, Fe7, Fe8	C, E, F
		Driver unit roll, coiler	Fe3	C
		Blacksmith's swage	Fe3, Fe4, Fe6, Fe8, Co1-3, Ni2, Ni4	C, D, F
		Impact sliding wear, cold	Shear blade, cutting edge	Fe4, Fe5, Fe8, Co1-3
Solid body – solid body with particles 	Impact sliding wear	Milling jaw, milling hammer	Fe6, Fe8, Fe9, Fe14	F, G, L
		Bash bar	Fe6, Fe8, Fe9	F, G
		Spike breaker	Fe6, Fe8, Fe9, Fe13-15	F, K, L, M, N
		Bandage for cement milling braker	Fe13-15	K, L, M
		Coal-, ore ring	Fe8, Fe13-15	F, K, L, M
		Grid bar, grid beam	Fe13-15	K, L, M
		Solid body – particles high surface pressure and impact	Impact sliding wear	Ploughshare, bucket knife
Dropping table, chute	Fe14, Fe15, Fe20, Ni20			L, M
Wear plate	Fe14, Fe15, Ni1-4, Ni20			L, M
Solid body – solid body and particles high surface pressure 	Grooving wear	Extruder	Fe14, Fe15, Fe20, Ni1, Ni3, Ni20, Co1-3	L, M, P, Q
		Decanter	Fe14, Fe15, Fe20, Ni1, Ni3, Ni20, Co2, Cr1	L, M, P, Q
		Bucket knife	Fe15, Fe20, Ni20	M
		Pickup	Fe2, Fe6, Fe8	B, F
		Mixer parts	Fe6, Fe8, Fe14, Fe20, Ni1, Ni3, Ni20	F, L, Q
		Brick pressing form	Fe6, Fe8, Fe14, Ni1, Ni3	F, L
		Milling segment, milling ring	Fe14	L
Solid body – particles and gas 	Particle based sliding wear (T>500°C)	Blast furnace -, converter gas valve	Fe6, Fe7, Fe8	E, F
		Blast furnace top	Fe6, Fe3, Fe8, (Fe16)	C, F, (N)
		Blast furnace feeding hopper	Fe15, Fe16	M, N
		Spike breaker, grate bar	Fe7, Co1, Co2	E, O, P
		Fan rotor, reinforcing bar	Fe10, Fe15, Fe16, Fe20, Ni1-4, Ni20	H, M, N, Q
		Fan wheel, wear plate	Fe14, Fe15, Fe20, Ni1, Ni3, Ni20	L, M, Q
Solid - fluid and particles 	Elutriation wear, fluid erosion	Steel tube, wear plate	Fe14, Fe15	L, M
		Sea shovel excavator guides	Fe6, Fe8	F
		Fluid pump	Fe6, Fe7, Fe8, Ni1, Ni3	E, F
	Erosion corrosion	Mixer parts	Fe6, Fe7, Fe8	E, F
		Marine propeller	Cu1	T
Solid - fluid	Korrosion	Water turbine	Fe7, Cu1	E, T
		Chemical device	Fe7, Fe11, Fe12	E
		Gadget valve seats	Fe7, Co1-3	E, O, P

* Alloy groups according to DIN EN 14700:2005

** Alloy groups according to old DIN 8555-1

We understand Wear Protection



- Tungsten Carbide Rods for Oxy-acetylene Welding
- Stellite* - Flux-Cored Wires
- Nickel-, and Iron-based Flux-Cored Wires
- FCAW wires with Tungsten Carbide
- Tungsten Carbides, Complex Carbides and Chromium Carbides for manual Arc Welding
- PTA Welding Powders, Fe-Ni-Co based Powders and special qualities

* Stellite is a registered trademark of Kennametal Stellite

- PTA machines, torches and powder feeders
- Powders and Wires for Laser Cladding
- Powders for Oxy-acetylene Welding and Spraying
- Fused Crushed and Spherical Fused Tungsten Carbides
- Pre-manufactured replacement wear parts
- Tungsten Carbide Wear Plates
- Wear Plates with Chromium Carbides and Complex Carbides
- Thermal Spray Powders (conforming to DIN EN 1274)
- Thermal Spray Wires (conforming to DIN EN 14919)



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