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Performance Tips and Guides

AIRBLAST EUROSPRAY

STEEL SURFACE FINISHING STANDARDS

AIRBLAST EUROSPRAY

	SA1	SA2	SA2 1/2	SA3
	BRUSH-OFF BLAST CLEANING	COMMERCIAL BLAST CLEANING	NEAR-WHITE BLAST CLEANING	WHITE METAL BLAST CLEANING
	Removal of loose mill scale, loose rust and loose paint, to a degree hereafter specified, by the impact of abrasives propelled through nozzles or by centrifugal wheels. It is not intended that the surface shall be free of all mill scale, rust and paint. The remaining mill scale, rust and paint should be tight and the surface should be sufficiently abraded to provide good adhesion and bonding of paint. A brush-off blast cleaned surface finish is defined as one from which all oil, grease, dirt, rust scale, loose mill scale, loose rust and loose paint or coatings are removed completely but tight mill scale and tightly adhered rust, paint and coatings are permitted to remain provided that all mill scale and rust have been exposed to the abrasive blast pattern sufficiently to expose numerous flecks of the underlying metal fairly uniformly distributed over the entire surface.	Removal of partial mill scale, rust, rust scale, paint or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels, to the degree specified. A commercial blast cleaned surface finish is defined as one from which oil, grease, dirt, rust scale and foreign matter have been completely removed from the surface and all rust, mill scale and old paint have been completely removed except for slight shadows, streaks, or discolouration caused by rust stain, mill scale oxides or slight, tight residues of paint or coating that may remain if the surface is pitted, slight residues of rust or paint may be found in the bottom of pits at least two-thirds of each square inch of surface area shall be free of all visible residues and the remainder shall be limited to the light discolouration, slight staining or tight residues mentioned above.	Removal of nearly all mill scale, rust, rust scale, paint, or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels, to the degree hereafter specified. A near-white blast cleaned surface finish is defined as one from which all oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or other foreign matter have been completely removed from the surface except for very light shadows, very slight streaks or slight discolourations caused by rust stain, mill scale oxides, or light, tight residues of paint or coating that may remain. At least 95% of each square inch of surface area shall be free of all visible residues and the remainder shall be limited to the light discolouration mentioned above.	Removal of all mill scale, rust, rust scale, paint or foreign matter by the use of abrasives propelled through nozzles or by the centrifugal wheels. A white metal blast cleaned surface finish is defined as a surface with a grey-white, uniform metallic colour, slightly roughened to form a suitable anchor pattern for coatings. The surface, when viewed without magnification, shall be free of all oil, grease, dirt, visible mill scale, rust, corrosion products, oxides, paint, or any other foreign matter.
	STEEL SURFACE LARGELY COVERED WITH ADHERING MILL SCALE BUT LITTLE, IF ANY, RUST.			
	STEEL SURFACE WHICH HAS BEGUN TO RUST AND FROM WHICH THE MILL SCALE HAS BEGUN TO FLAKE.			
	STEEL SURFACE ON WHICH THE MILL SCALE HAS RUSTED AWAY, BUT WITH SLIGHT PITTING VISIBLE UNDER NORMAL VISION.			
	STEEL SURFACE ON WHICH THE MILL SCALE HAS RUSTED AWAY. GENERAL PITTING IS VISIBLE UNDER NORMAL VISION.			
SSPC-SP-7 / SA 1 / NACE 4	Steel Structures Painting Council (USA); Swedish Standards Organisation; National Organisation of Corrosion Engineers (USA)			
SSPC-SP-6 / SA 2 / NACE 3 / 3rd Quality	Steel Structures Painting Council (USA); Swedish Standards Organisation; National Organisation of Corrosion Engineers (USA); United Kingdom Standards (BS 4232)			
SSPC-SP-10 / SA 2-1/2 / NACE 2 / 2nd Quality	Steel Structures Painting Council (USA); Swedish Standards Organisation; National Organisation of Corrosion Engineers (USA); United Kingdom Standards (BS 4232)			
SSPC-SP-5 / SA 3 / NACE 1 / 1st Quality	Steel Structures Painting Council (USA); Swedish Standards Organisation; National Organisation of Corrosion Engineers (USA); United Kingdom Standards (BS 4232)			

ACHIEVING THE BEST FINISH

The finish surface achieved by abrasive blast cleaning depends upon the original surface condition as well as the type of abrasive blasting equipment, size, hardness, type and abrasive shape.

THE ORIGINATING SURFACE CONDITION OF STEEL IS:

- Steel surface largely covered with adhering mill scale by little, if any, rust.
- Steel surface which has begun to rust and from which the mill scale has begun to flake.
- Steel surface on which the mill scale has rusted away and on which general pitting is visible under normal vision.

SURFACE CLEANLINESS IS DIVIDED INTO FOUR GRADES:

- SA 1 Brush off.
- SA 2 Commercial.
- SA 2-1/2 Near white metal.
- SA 3 White Metal.

Besides cleanliness of the steel, consideration needs to be given to the etch or profile roughness created by the impact of the abrasive on the steel surface.

THE SUBSTRATE PROFILE IS REGULATED BY:

- Shape, type and grading of abrasive.
- Blasting method and velocity of abrasive impaction.
- Steel condition prior to blasting.

The etched profile of the surface enables adhesion of the protective paint coatings. If the level at which this is achieved is too severe it will cause a waste of paint. If too light, it may cause a lack of adhesion.

The best method of obtaining a profile specification is to ensure the correct blasting equipment and method are combined with the correct abrasive. Once these requirements have been decided upon, the selection of method, equipment and training of personnel should be instigated.

Equipment used for surface preparation must be extremely reliable and simple to use. Operation information and training should be up-to-date.

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AIRBLAST EUROSPRAY, AN INTRODUCTION

Airblast Eurospray is one of the leading global voices in surface preparation and finishing. We design, manufacture, install and sell blast and spray equipment and facilities to some of the world's most important organisations. With roots stretching back to 1971, we're known for driving the market with innovative, technically excellent blast and paint solutions for a wide range of industries.

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NOZZLE PRESSURE/DIAMETER/SERVICE LIFE/AIR VOLUME

Nozzle pressure/Nozzle diameter guide

Orifice	60PSI	4.2BAR	70PSI	4.9BAR	80PSI	5.6BAR	90PSI	6.3BAR	100PSI	7.0BAR	120PSI	8.5BAR			
5.0mm 3/16"	30.0	0.85	33	0.93	38	1.08	41	1.16	45	1.27	58	1.64	Required Air	CFM	m^3/min
	171	77	196	89	216	96	238	108	264	120	375	170	Required Abrasive	ltr/hr	kg/hr*
	7	5.3	8	5.6	9	6.4	10	7.1	10	7.5	12	9	Required Power	hp	kw
6.5mm 4/16"	54	1.53	61	1.73	68	1.93	74	2.1	81	2.29	105	2.97	Required Air	CFM	m^3/min
	312	141	354	160	408	185	448	203	494	224	660	300	Required Abrasive	ltr/hr	kg/hr*
	12	9	14	10.1	16	11.6	17	12.4	18	13.5	22	16.2	Required Power	hp	kw
8.0mm 5/16"	89	2.52	101	2.86	113	3.2	126	3.57	137	3.88	160	4.53	Required Air	CFM	m^3/min
	534	242	604	274	672	305	740	335	850	385	1050	476	Required Abrasive	ltr/hr	kg/hr*
	20	15	23	19.1	26	20.2	28	21	31	22.9	37	27.5	Required Power	hp	kw
9.5mm 6/16"	126	3.57	143	4.05	161	4.56	173	4.9	196	5.55	235	6.65	Required Air	CFM	m^3/min
	764	346	864	392	960	425	1052	477	1152	523	1475	669	Required Abrasive	ltr/hr	kg/hr*
	28	21	32	24	36	27	39	28.9	44	33	52	39.6	Required Power	hp	kw
11.0mm 7/16"	170.0	4.81	184	5.21	217	6.14	240	6.8	254	7.19	315	8.92	Required Air	CFM	m^3/min
	1032	468	1176	533	1312	595	1448	657	1584	719	2050	930	Required Abrasive	ltr/hr	kg/hr*
	38	28.5	44	32.6	49	36.4	54	40.1	57	42.4	69	50.9	Required Power	hp	kw
12.5mm 8/16"	224	6.34	252	7.14	280	7.93	309	8.75	338	9.57	410	11.61	Required Air	CFM	m^3/min
	1336	606	1512	686	1680	762	1856	842	2024	918	2650	1202	Required Abrasive	ltr/hr	kg/hr*
	50	37.5	56	42	63	46.9	69	51.8	75	56.3	90	67.6	Required Power	hp	kw

Chart shows calculated consumption rates of air and abrasive for new nozzles. When selecting a compressor, add 50% to above figures to allow for normal nozzle wear and friction loss.
*Based on abrasive density of 1.5kg per litre.
NOTE: Figures may vary depending on working conditions. To maintain desired air pressure as nozzle orifice wears, air consumption increases.
The effects of nozzle wear on air consumption must be considered when selecting nozzles and the compressors that support them. Contact Technical Support to find out more.

Approximate nozzle service life in hours*

Nozzle material	Steel shot and grit	Expendable abrasives	Alu-oxide abrasives
Tungsten carbide	500–800	300–400	20–40
Silicon carbide and nitride	600–1000	400–600	50–100
Boron carbide	1500–2500	750–1500	200–1000

* Estimated values for comparison. Actual service life will vary depending upon blast pressure, media size and particle shape.

Minimum Air Volume Table. Air volume requirements at 100PSI for a complete blast system

Nozzle	Size of orifice	Volume of air	Plus helmet	Plus 50% (reserve)	Minimum air required
No. 4	¼"	81	20	50	151CFM
	6.5mm	2.3	0.5	1.4	4.2m^3/min
No. 5	5/16"	137	20	79	236CFM
	8.0mm	3.9	0.5	2.2	6.6m^3/min
No. 6	3/8"	196	20	108	324CFM
	9.5mm	5.5	0.5	3.0	9.0m^3/min
No. 7	7/16"	254	20	137	411CFM
	11mm	7.2	0.5	3.9	11.6m^3/min
No. 8	½"	338	20	179	537CFM
	12.5mm	9.6	0.5	5.0	161.m^3/min

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NOZZLE SELECTOR TYPE GUIDE/AIR LINE SIZES

Type	Casing	Liner	Length			Inlet		Thread		Orifice size range	
			Short	Medium	Long	1"	1¼"	Fine	Large (50mm)	mm	inches
ATSD	Aluminium	Tungsten Carbide			•	•		•		5.0–12.5	3/86–½
ATSDX	Aluminium	Tungsten Carbide			•		•	•		6.5–19.0	¼– ¾
ATSDX-X/50	Aluminium	Tungsten Carbide			•		•		•	6.5–19.0	¼– ¾
RJL-X/50	Alu/Rubber sleeved	Tungsten Carbide			•		•		•	5.0–19.0	3/16–¾
ATJD	Aluminium	Tungsten Carbide		•		•		•		5.0–12.5	3/16–½
ATJDX	Aluminium	Tungsten Carbide		•			•	•		8.0–16.0	5/16–5/8
ATJDX-X/50	Aluminium	Tungsten Carbide		•			•		•	8.0–16.0	5/16–5/8
AT	Aluminium	Tungsten Carbide	•					•		3.0–12.5	1/8–½
ATL	Aluminium	Tungsten Carbide	•						•	3.0–12.5	1/8–½
AAM-X/50	Aluminium	Tungsten Carbide		•		•			•	3.0– 9.5	1/8–3/8
ABSN-X/50	Polyurethane	Silicon Nitride			•		•		•	5.0–12.5	3/16–½"
ABCL-X/50	Aluminium	Boron Carbide			•	•			•	6.5–12.5	¼–½

Minimum Compressor Air line sizes

Nozzle orifice size	Minimum air line ID
¼" (6.5mm)	1" (25mm)
5/16" (8.0mm)	1¼" (32mm)
3/8" (9.5mm)	1½" (38mm)
7/16" (11.0mm)	2" (50mm)
½" (12.5mm)	2" (50mm)
5/8" (16.0mm)	2½" (64mm)
¾" (19mm)	3" (76mm)

Compatibility Guide

No.	Nozzle orifice	Recommended range m³/min	Recommended range CFM	Minimum blast machine capacity (ltr)	Minimum pipe ID	Blast hose ID	Minimum air hose ID
3	5.0mm	1.27–2.29	45–81	60	1"	¾"	1"
4	6.5mm	2.29–3.88	81–137	60	1"	1"–1¼"	1¼"
5	8.0mm	3.88–5.55	137–196	100	1"	1"–1¼"	1¼"
6	9.5mm	5.55–7.19	196–254	200	1¼"	1¼"	1½"
7	11.0mm	7.19–9.57	254–338	200	1¼"	1"–1¼"	2"
8	12.5mm	9.57–15.52	338–548	200	1¼"	1"–1¼"	2"

Note: Best performance is obtained when sizes of nozzle, blast machine piping, blast hose and air hose are properly matched.

- m³/min and CFM range is based on blasting at 7bar (100psi) for the life of the nozzle.
- Blast machine capacity should allow 20 to 30 minutes of blasting.
- Hose ID should be three to four times the size of the nozzle orifice.

ABRASIVE BLAST PERFORMANCE GUIDE

Nozzle size (mm)	**4.8**	**6.5**	**8.0**	**9.5**	**11.0**	**12.5**
CFM @ 7bar/100psi	46	83	129	187	254	332
Sand usage/hr	330	618	1015	1440	1980	2530
FINISH: White Metal NACE #1/SA3			**m^2 per hour**			
Loose Mill Scale; Light Rust; No Surface Pitting	3.1	5.8	101	13.4	18.4	23.5
Tight Mill Scale; Overall Rust; Some Pitting	2.5	4.7	7.9	11.1	17.2	19.5
Painted Surface; Heavy Rust; Pitted Surface	1.5	2.9	4.7	6.7	9.2	11.7
Multi-Coated or Heavily Pitted; Rust Scale	1.2	2.3	3.8	5.3	7.3	9.4
FINISH: Near White NACE #2/SA2½			**m^2 per hour**			
Loose Mill Scale; Light Rust; No Surface Pitting	3.3	7.9	9.8	14.0	19.3	24.7
Tight Mill Scale; Overall Rust; Some Pitting	2.6	5.0	8.3	11.7	16.1	20.4
Painted Surface; Heavy Rust; Pitted Surface	1.6	3.1	5.0	7.2	9.7	12.3
Multi-Coated or Heavily Pitted; Rust Scale	1.3	2.4	4.0	5.6	7.7	9.8
FINISH: Commercial NACE #3/SA2			**m^2 per hour**			
Loose Mill Scale; Light Rust; No Surface Pitting	7.6	14.3	23.4	33.4	46.0	77.3
Tight Mill Scale; Overall Rust; Some Pitting	5.1	9.6	17.6	22.3	30.7	39.1
Painted Surface; Heavy Rust; Pitted Surface	3.8	7.2	11.8	16.7	22.9	29.5
Multi-Coated or Heavily Pitted; Rust Scale	2.5	4.7	7.9	11.1	15.3	19.5

Performance results should be used as a guide only.

Effect of nozzle wear on air consumption

Nozzle size	**Orifice size**		**Air flow** (CFM)	**Increase in air consumption**
	Imperial	**Metric** (mm)		
4	¼	6.5	81	
5	5/16	8.0	137	96% more than No. 4
6	3/8	9.5	196	43% more than No. 5
7	7/16	11.0	254	29% more than No. 6
8	½	12.5	338	33% more than No. 7

Information shown is based upon air consumption at 100psi (7bar/700kPa)

CHECKING COMPRESSED AIR QUALITY

Prior to blasting and/or blowing off the work surface

Why compressed air quality is critical:
One of the key aims of blast cleaning is to remove surface contaminants, corrosion, old paint etc. to ensure the performance of the coating system.

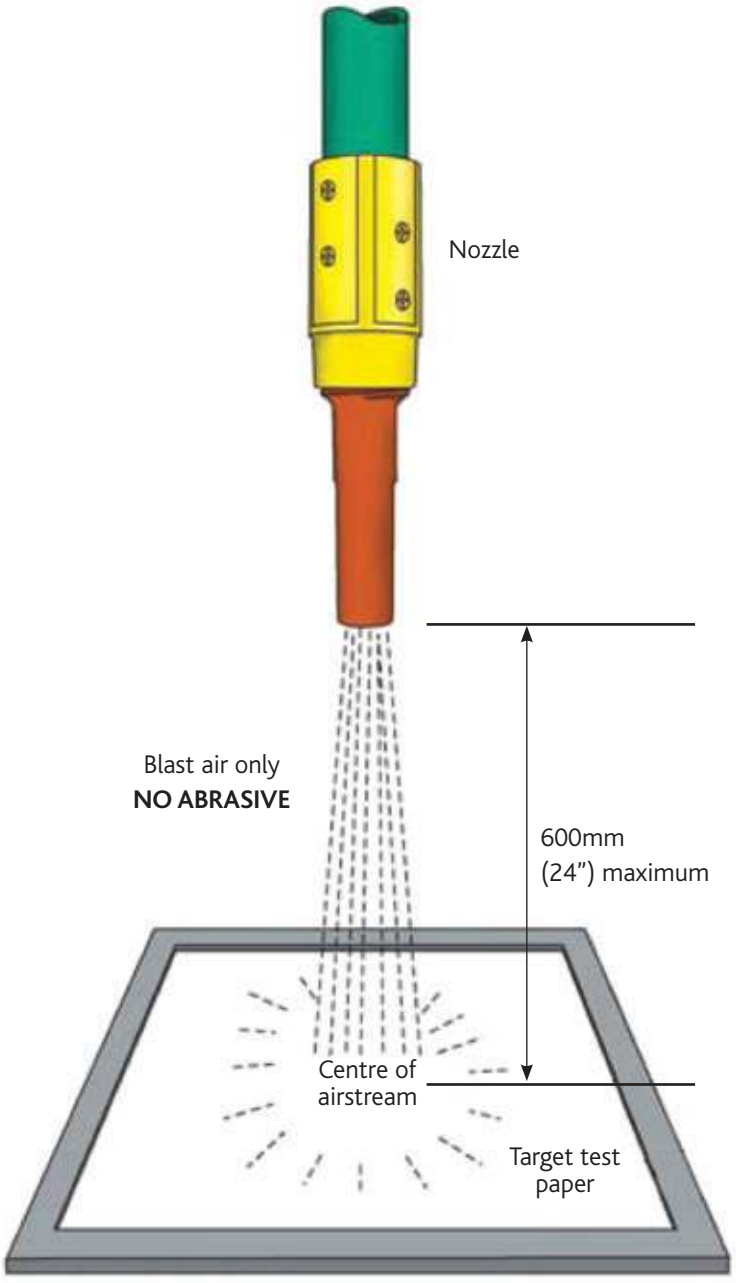
The compressed air must be clean, otherwise the blasting will introduce fresh contaminants as fast as the old contaminants are removed.

Contaminants to check in the compressed air
- Dirt
- Oil (mist or droplets)
- Moisture (mist or droplets)

Each and all of these can cause coating failure.

Recommended check intervals
- Test before commencing blasting
- Every 4 hours when blasting continuously

Blotter paper method to check air quality
1. Start the compressor and set up the blast equipment
2. Secure the test paper apparatus
3. When the compressor is warmed up, start the blast equipment with NO abrasive in the airstream
4. Position the nozzle so the test paper is in the centre of the airstream and within 24" (600mm) of the nozzle
5. Sustain the test for 2 minutes continuously
6. After 2 minutes, stop the test and immediately check the test paper for any sign, feel, or smell of oil, moisture or other contaminants.



DISCLAIMER: The above information and procedure is for illustrative purposes only and is not intended to be an approved or standard method for testing compressed air quality. Airblast Europsray expressly disclaims liability for the use or misuse of the above information and procedure.

PAINT APPLICATION TABLES

Formula

Corrected volume solids (CVS)

CVS = Original volume solids x 100 / (100 + % thinner added)

Corrected volume solids (to the nearest 1%) after adding thinner to various initial volume solids coatings

Amount of thinner added per 20 litres

%	2.5%	3.125%	5%	6.25%	7.5%	10%	12.5%	18.75%	25%	27.5%
ml	500	625	1000	1250	1500					
litres			1	1.25	1.5	2	2.5	3.75	5	7.5
Initial volume solids before thinning										
100%	98	97	96–95	94	93	91	89	84	80	73
95%	93	93	91–90	90	89–88	87	85	81	77	70
90%	88	87	86	84	84	82	80	76	72	66
85%	83	82	81	80	79	78	76	72	68	62
80%	78	78	77–76	75	74	73	71	68	64	58
75%	73	73	72	71	70	69–68	67	63	60	55
70%	68	68	67	66	65	64	62	59	56	51
65%	64	63	62	61	60	60–59	58	55	52	47
60%	59	58	57	57	56–55	55	53	51	48	44
55%	54	53	53–52	52	51	50	49	46	44	40
50%	49	48	48	47	46	46	45	42	40	36
45%	44	44	43	42	42	41	40	38	36	33
40%	39	39	38	38	37	37–36	36	34	32	29
35%	34	34	34	33	33	32	31	30	28	26
30%	29	29	29	28	28	27	27	25	24	22
25%	24	24	24	24	23	23	22	21	20	18

Formula

Applied Wet Film Thickness (WFT)

WFT = Dry Film Thickness (DFT) x 100 / Corrected Volume Solids (CVS)

Application wet film thickness (in microns)* to achieve required DFT for various volume solids coatings

Volume Solids %

	35	40	45	50	55	60	65	70	75	80	85	90	95
Required CFT (microns)													
25	71	63	56	50	46	42	39	36	33	31	29	28	26
50	143	125	111	100	91	83	77	71	67	63	59	56	53
75	214	188	167	150	136	125	115	107	100	94	88	83	79
100	286	250	222	200	182	167	154	143	133	125	118	111	105
125	357	313	278	250	227	208	192	179	167	156	147	139	132
150	429	375	333	300	273	250	231	214	200	188	176	167	158
175	500	438	389	350	318	292	269	250	233	219	206	194	184
200	571	500	444	400	364	333	308	286	267	250	235	222	211
250	714	625	556	500	455	417	385	357	333	313	294	278	263
300	857	750	667	600	546	500	462	429	400	375	353	333	316

*Theoretically calculated figures are NOT applicable for zinc coatings

PAINT APPLICATION INFORMATION

Formula

Theoretical Spreading Rate (SR)

$$SR = \frac{\text{Corrected Volume Solids (CVS)} \times 10}{\text{Dry Film Thickness Volume (DFT)}}$$

Spreading rate (m^2/ltr) achieving required DFT for various solids coatings

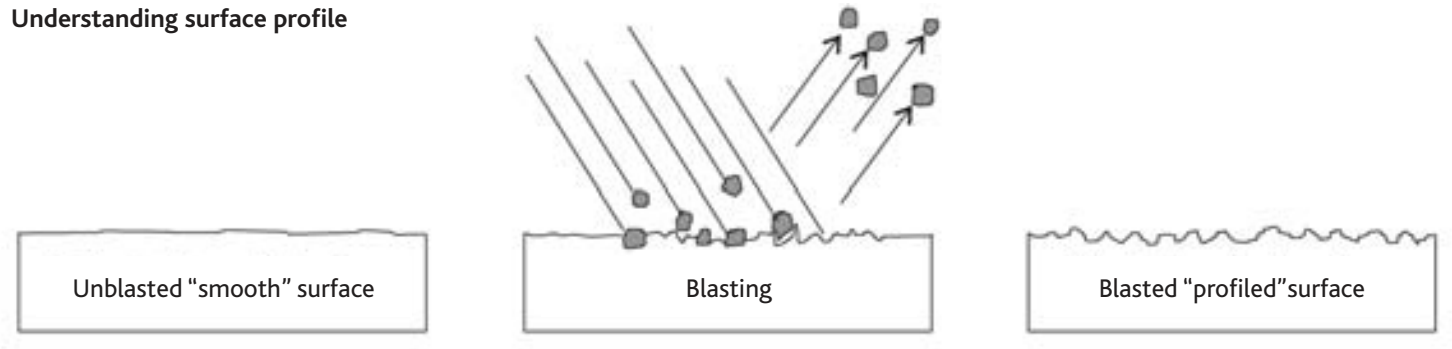
Volume Solids %

Dry Film Thickness (microns)	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
20	10.0	12.5	15.0	17.5	20.0	22.5	25.0	27.5	30.0	32.5	35.0	37.5	40.0	42.5	45.0	47.5	50.0
25	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	32.0	34.0	36.0	38.0	40.0
30	6.7	8.3	10.0	11.7	13.3	15.0	16.7	18.3	20.0	21.7	23.3	25.0	26.7	28.3	30.0	31.7	33.3
50	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0
75	2.7	3.3	4.0	4.7	5.3	6.0	6.7	7.3	8.0	8.7	9.3	10.0	10.7	11.3	12.0	12.7	13.3
100	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
125	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.4	4.8	5.2	5.6	6.0	6.4	6.8	7.2	7.6	8.0
150	1.3	1.7	2.0	2.3	2.7	3.0	3.3	3.7	4.0	4.3	4.7	5.0	5.3	5.7	6.0	6.3	6.7
175	1.1	1.4	1.7	2.0	2.3	2.6	2.9	3.1	3.4	3.7	4.0	4.3	4.6	4.9	5.1	5.4	5.7
200	1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0	4.3	4.5	4.8	5.0
250	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0
300	0.7	0.8	1.0	1.2	1.3	1.5	1.7	1.8	2.0	2.2	2.3	2.5	2.7	2.8	3.0	3.2	3.3
400	0.5	0.6	0.8	0.9	1.0	1.1	1.3	1.4	1.5	1.6	1.8	1.9	2.0	2.1	2.3	2.4	2.5
500	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0

*Theoretically calculated figures may vary from practical spreading rates by as much as 50% or more.

SURFACE PROFILE

Understanding surface profile



In the blast cleaning process, grains of abrasive are propelled with great force and energy at the work surface. On impact, the grains 'dig' into and then rebound out and off the surface leaving a rugged, miniature 'mountain - and - valley' finish.

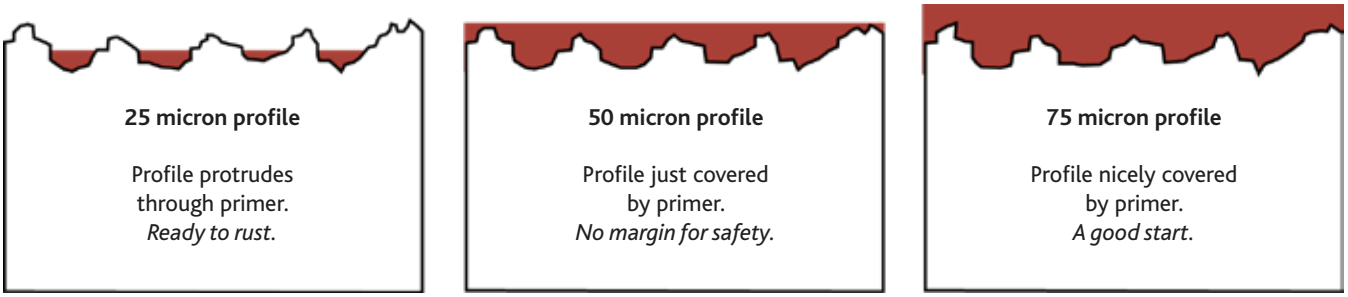
This surface roughness/etch/texture is the surface profile.

Surface profile is critical to coating performance by

- increasing the surface area
- providing a 'key/tooth/anchor pattern' for the coating to lock and adhere to

The difference between surface profile and class of blast

Surface profile is concerned with the 'shape' of the surface finish (and measuring the size of the 'shape' created) whereas Class of Blast is concerned with 'cleanliness' of the surface finish. (Putting it another way – Class of Blast is determining to what degree the rust, paint and other contaminants have been removed). Both the Profile and the Class of Blast are important features of the surface finish and need to be separately specified in preparing a blast-cleaned steel surface.

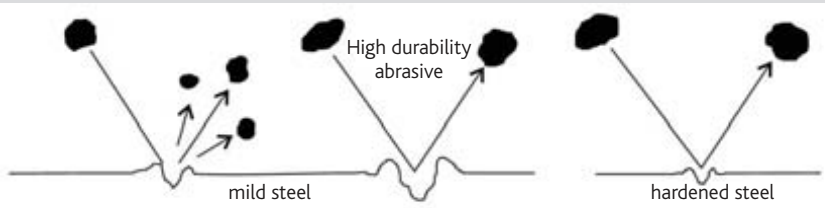


The pitfalls of surface profile

Excess Profile	While an absence of profile can be detrimental to coating adhesion, it can be equally disastrous to have an excessive profile height causing premature rusting and coating failure. In addition, more profile means using more paint to cover the surface! Consider these cases...
Rule of Thumb #1	Profile height should not exceed the primer coat DFT.
Rule of Thumb #2:	Profile height should not exceed $\frac{1}{3}$ the total coating system DFT.
Embedment	Embedment of abrasive particles in the surface is a threat posed by friable, irregular shape abrasives. The embedded particle or fragment can stand out as a 'rogue' peak above the surrounding profile and protrude through the applied coating.

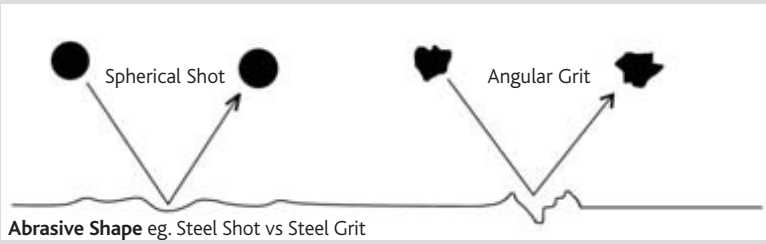
SURFACE PROFILE

Factors which have an effect on surface profile



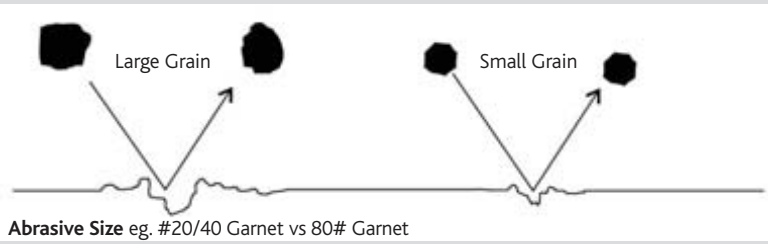
Abrasive Durability - Surface hardness eg. Bicarb media vs Alox, Mild Steel vs Hardened Steel

Variable	Effect
More durable abrasive	= deeper profile
Less durable abrasive	= shallower profile
Hardened steel	= shallower profile
Mild steel	= deeper profile



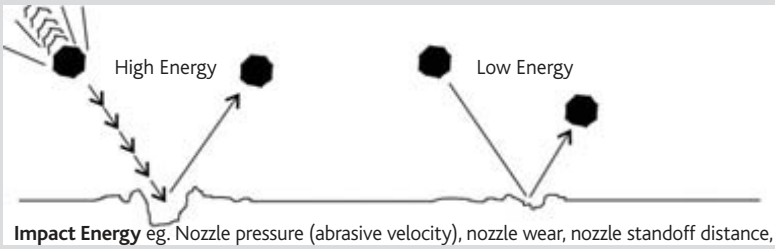
Abrasive Shape eg. Steel Shot vs Steel Grit

Variable	Effect
Round abrasive	= dimpled, peened profile
Angular abrasive	= sharper, rugged, profile



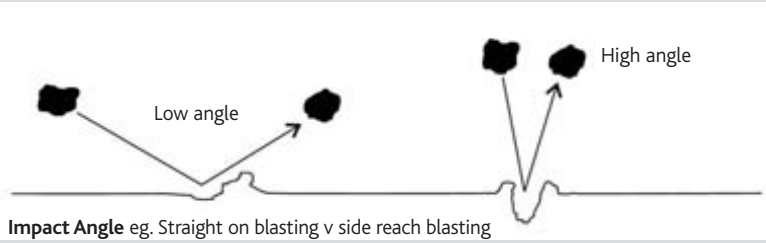
Abrasive Size eg. #20/40 Garnet vs 80# Garnet

Variable	Effect
Larger abrasive	= deeper profile
Smaller abrasive	= shallower profile



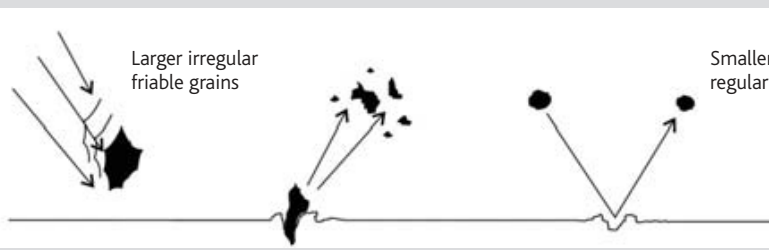
Impact Energy eg. Nozzle pressure (abrasive velocity), nozzle wear, nozzle standoff distance, dwell time

Variable	Effect
Greater energy	= deeper profile
Lesser abrasive	= shallower profile



Impact Angle eg. Straight on blasting v side reach blasting

Variable	Effect
Low angle	= more scuffed profile
High angle	= more peak 'n' valley even profile



Variable	Effect
Large friable irregular grains	= higher risk of embedment
Smaller durable regular grains	= lower risk of embedment

SURFACE CLEANLINESS FACTORS

Subtle contaminants – Causes, Tests and Prevention

In addition to the obvious gross surface contaminants such as rust and old coatings, there are some subtle but serious contaminants which can cause major coating failure.

Salt (specifically chloride ions)

Possible causes

New steel
- Contaminated abrasive
- Contaminated water (rinsing or pressure washing)

Existing steel
- Both of the above, plus environmental industrial exposure, e.g. marine location or industrial process.

Tests
- Many methods are available including:
- ChlorTest kits
- Bresle patches
- SCAT kits
- Conductivity meters
- Refer work specification and relevant AS/ISO standards.

Prevention
- Use a traceable quality, low salt abrasive, e.g. GMA Garnet
- Test abrasive for chloride content
- Test cleaning water for chloride content
- Pretest existing structures for chloride presence prior to blasting
- Rinse with clean water and/or a soluble salts remover e.g. Chloride

Dust/Debris

Possible causes
- Poor quality abrasive causing excessive dust and debris, e.g. crushed glass
- Failure to blow-off surface completely after blasting

Tests
- Clean rag wipe test
- Pressure sensitive tape method
- Refer work specifications and relevant AS/ISO standard

Prevention
- Use a low dust abrasive, e.g. GMA Garnet
- Blow-off all surfaces after blasting

Oil/Grease (thin film)

Possible causes

New steel
- Mill or warehousing or fabrication treatments
- Contaminated compressed air

Existing steel
- The above
- Plus environmental exposure

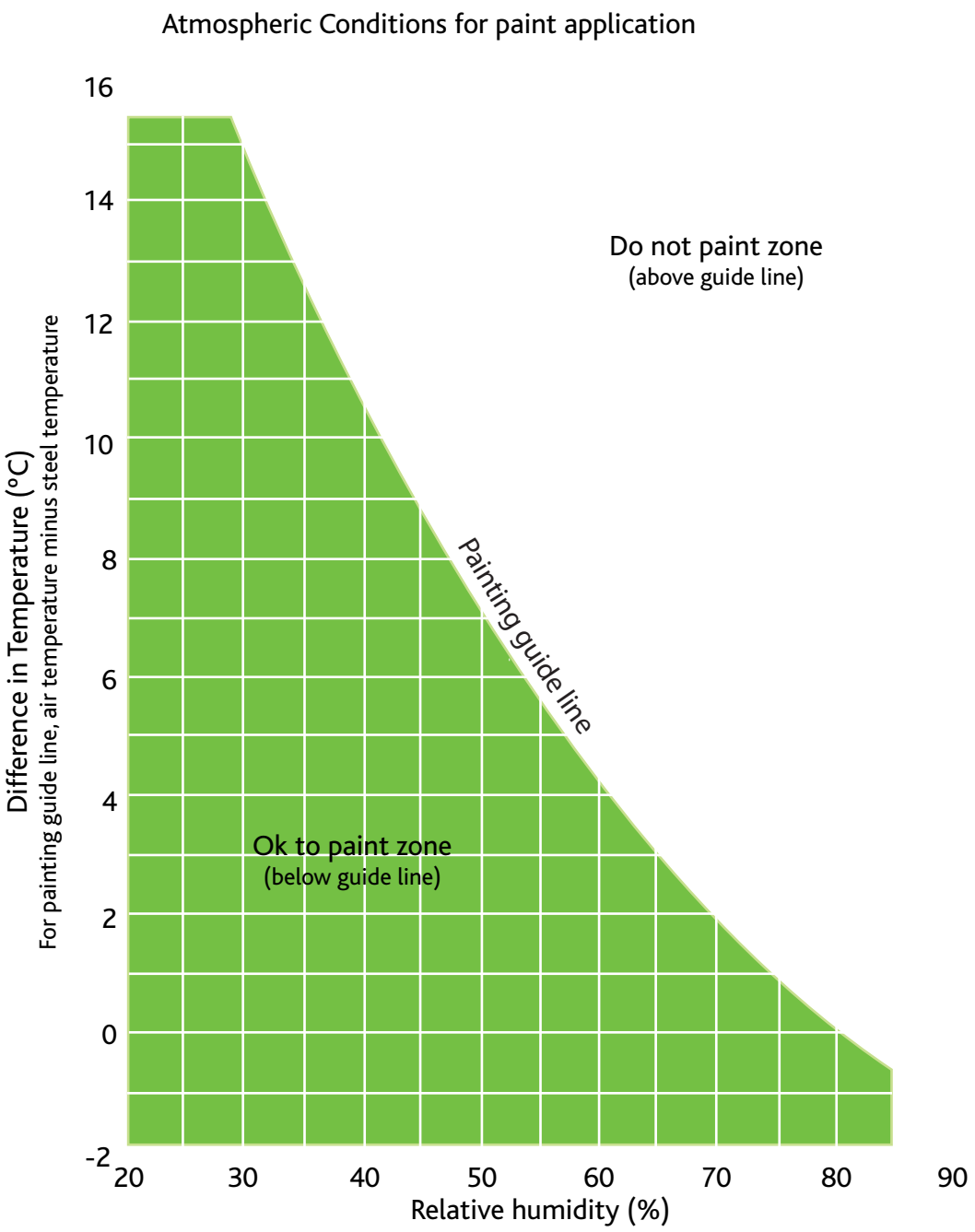
Tests
- Water Break Test
- UV Illumination Test
- Refer work specifications and appropriate AS/ISO standards.

Prevention
- Test and maintain compressed air quality
- Pretest and/or preclean work prior to blasting by degreasing and/or rinsing

CLIMATIC CONDITIONS FOR SAFE PAINTING

It is critical to the success of most coating systems, that the surface is completely free of moisture prior to and during paint application and curing.

Dewpoint
Condensation of water (dew) from the atmosphere on to the surface will occur, given the right conditions. For a given set of conditions, the temperature at which condensation will occur is called the Dewpoint. As long as the surface temperature is 3°C (or more) above the Dewpoint temperature, it is generally considered safe to paint as far as risk of condensation is concerned.



Instructions for use

1. Measure
- air temperature
- surface temperature
- relative humidity

Use the same instrument for reading the air and surface temperature, and with an accuracy of ±0.5°C

2. Calculate
The temperature difference i.e. air temperature minus surface temperature

3. Plot and intersect on the chart
The temperature difference and the relative humidity

If the intersection point is BELOW the guide line
- indicates conditions are safe to paint.

ABOVE the guide line
- indicates UNSAFE conditions for painting

DISCLAIMER: The above information and chart do not represent or intend to be the approved nor standard method nor procedure for ensuring suitable climatic conditions for painting. Airblast Eurospray expressly disclaims any liability for the use or misuse of this information and/or procedures.

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ABRASIVES

Abrasive Characteristic Comparison

Material	Mesh size	Shape	Density l/ft³	Mohs	Fiability	Initial Cos	No. of cycles	Per use cost	Source	Typical applications
Sil. Sand	6–270	⬢	100	5.0–6.0	high	low	1	med	nat	Outdoor blast cleaning
Min. Slag	8-80	⬢	85–112	7.0–7.5	high	med	1–2	med	bp	Outdoor blast cleaning
Steel Grit	10–325	⬢	230	8.0	low	high	200+	med	mfg	Removing heavy scale
Steel Shot	8–200	●	280	8.0		high	200+	low	mfg	Cleaning, peening
Al. Oxide	12–325	⬢	125	8.0–9.0+	med	high	6–8	med	mfg	Cleaning, finishing, deburring, etching
Glass bead	10–400	●	85–90	5.5	med	med	8–10	low	mfg	Cleaning, finishing
Plastic	12–80	⬢	45–60	3.0–4.0	low/med	high	8–10	med	mfg	Paint stripping, deflashing, cleaning
Wheat Starch	12–80	⬢	45	3.0	med	med	12–15	high	mfg	Paint, adhesive removal, composites
XL-Corn Hybrid Polymer	16–60	⬢	45	3.0	low	high	14–17	med	mfg	Composite paint removal adhesive deflash
Corn cob	8–40	⬢	35–45	2.0–4.5	med	low	4–5	low	bp	Removing paint from delicate surfaces

⬢ =Angular ● =Spherical nat = Natural bp = By-product mfg = manufactured

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CONVERSION FACTORS

Imperial to Metric

Length	
thousandth of inch (thou or mil)	x 25.4 = µm
inches (in)	x 25.4 = mm
feet (ft)	x 0.3048 = m
Area	
square inches (in^2)	x 645.16 = mm^2
square feet (ft^2)	x 0.0929 = m^2
Volume	
cubic inches (cu in)	x16.38716 = cm^3 or mL
cubic feet (cu ft)	x 0.028317 = m^3
cubic feet (cu ft)	x 28.31701 = L
US gallons (gal)	x 3.7854 = L
quart (qt)	x 0.9464 = L
fluid ounces (fl oz)	x 29.57 = mL
Speed – Velocity	
feet per minute (ft/min)	x 0.00508 = m/s
feet per second (ft/s)	x 0.03048 = m/s
Flow Rate	
cubic feet per minute (CFM)	x 0.47195 = L/s
cubic feet per minute (CFM)	x 0.028317 = m^3/min
cubic feet per minute (CFM)	x 1.69902 = m^3/hr
US gallons per minute (gpm)	x 3.7854 = L/min
Weight – Mass	
pounds (lb)	x 0.4536 = kg
Bulk - Density	
pounds per cubic foot (lb/cuft)	x 16.0185 = kg/m^3
pounds per cubic foot (lb/cuft)	x 0.016019 = kg/L
Pressure	
pounds per square inch (psi)	x 6.8947 = kPa
pounds per square inch (psi)	x 0.0068947 = MPa
pounds per square inch (psi)	x 0.068947 = bar
Vacuum	
inches of mercury (in. Hg)	x 3.38638 = -kPa
inches of mercury (in. Hg)	x 13.596 = in. H_2O
Power	
horsepower (hp)	x 0.7457 = kW
Temperature	
degrees Fahrenheit (°F)	-32, then x 0.5555 = °C

Metric to Imperial

Length	
microns (µm)	x 0.03937 = thou or mil
millimetres (mm)	x 0.03937 = in
metres (m)	x 3.28083 = ft
Area	
square millimetres (mm^2)	x 0.00155 = in^2
square metres (m^2)	x 10.7639 = ft^2
Volume	
cubic centimetres (cm^3)	x 0.061023 = cu in
cubic metres (m^3)	x 35.3145 = cu ft
litres (ltr)	x 0.035315 = cu ft
litres (ltr)	x 0.26417 = US gal
litres (ltr)	x 1.05668 = qt
millilitres (mL)	x 0.03381 = fl oz
Speed – Velocity	
metres per second (m/s)	x 196.85 = ft/min
metres per second (m/s)	x 3.28083 = ft/s
Flow Rate	
litres per second (ltr/s)	x 2.11887 = CFM
cubic metres per minute (m^3/min)	x 35.3145 = CFM
cubic metres per hour (m^3/hr)	x 0.58857 = CFM
litres per minute (ltr/min)	x 0.26417 = US gpm
Weight – Mass	
kilograms (kg)	x 2.2046 = lb
Bulk - Density	
kilograms per cubic metre (kg/m^3)	0.062428 = lb/cuft
kilograms per litre (kg/ltr)	x 62.4277 = lb/cuft
Pressure	
kilopascals (kPa)	x 0.145 = psi
megapascals (MPa)	x 145.04 = psi
bar (bar)	x 14.504 = psi
Vacuum	
kilopascals vacuum (-kPa)	x 0.2953 = in. Hg
inches of water (in. H_2O)	x 0.07355 = In. Hg
Power	
kilowatts (kW)	x 1.341 = hp
Temperature	
degrees Celsius (°C)	x 1.8, then +32 = °F

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