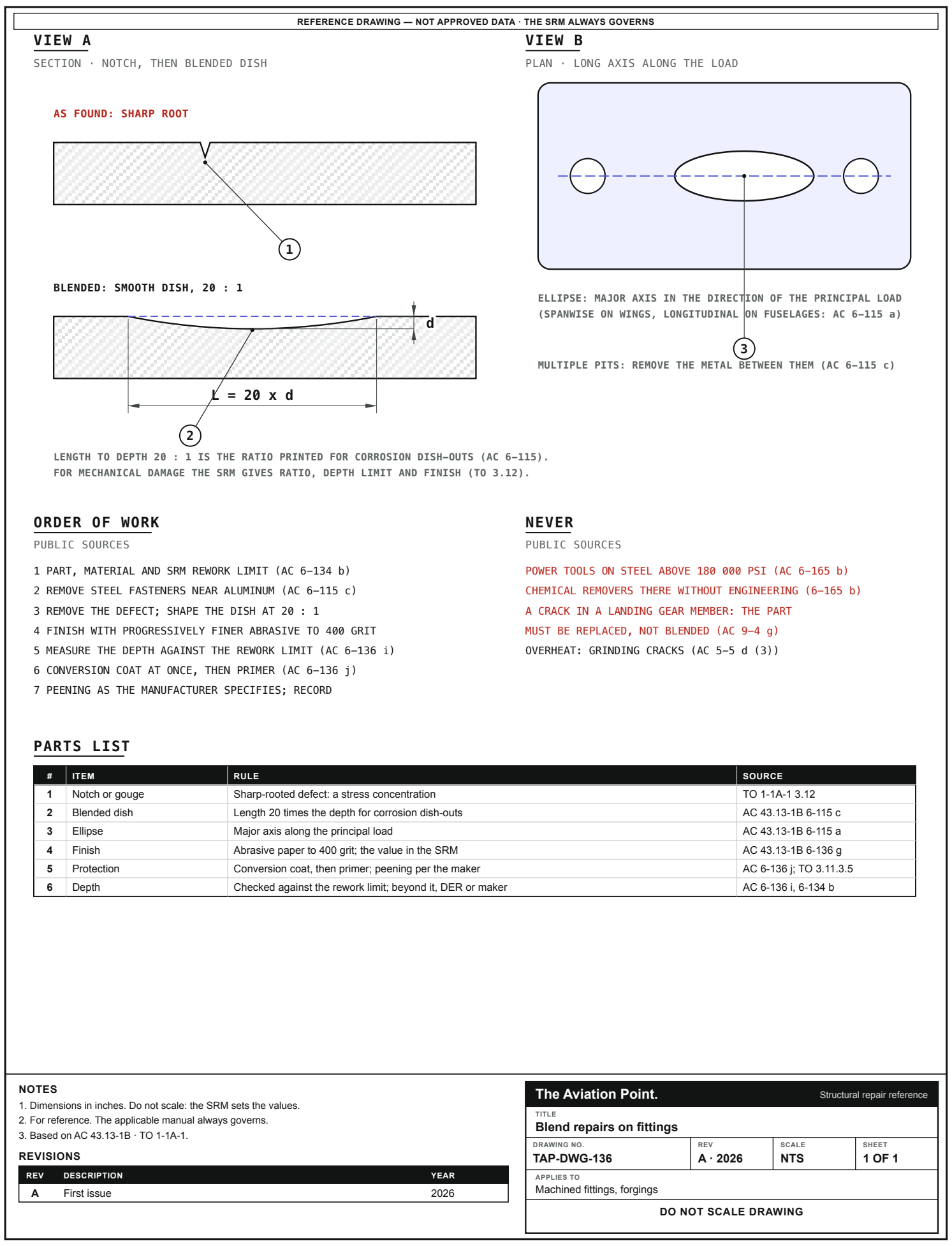
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Blend Repairs on Machined Fittings and Forgings: Ratio, Finish and Protection

Blend · ratio · finish · protection · peening · what the SRM sets

1 Identification



After AC 43.13-1B pars. 6-115, 6-136, 6-165; TO 1-1A-1 (NAVAIR 01-1A-1) pars. 3.11.3.4, 3.12.

2 Allowable damage

What the public documents set

Item	Published rule	Source
Ratio, corrosion dish-outs	20 : 1, length to depth, smoothly blended; elliptical, major axis spanwise on wings and horizontal stabilizers, longitudinal on fuselages, vertical on vertical stabilizers	AC 43.13-1B par. 6-115 a, c
Ratio and depth, mechanical damage	—: the aircraft SRM gives the blend allowance. 20 : 1 is not a general rule for a scratch or nick	TO 1-1A-1 par. 3.12
Rework depth limit	—: the SRM. Determine the depth of the faired depression to be sure the limit is not exceeded; beyond it the aircraft manufacturer or a DER decides	AC 43.13-1B pars. 6-136 i, 6-134 b
Which pits to blend	Critical and highly stressed areas: every pit left after removing the corrosion. Non-critical structure: pits left by blasting need not be blended out, which would only take more metal	AC 43.13-1B par. 6-115 b
Surface finish	Abrasive paper progressively finer to 400 grit (aluminum); magnesium and steel: 240, then 300, then 400 grit. A roughness value is —: the SRM	AC 43.13-1B pars. 6-136 g, 6-152 h, 6-167 h; TO 1-1A-1 par. 3.12
Fillet radius	—: the drawing or the SRM. Sharp corners are avoided and radii at holes and edges are generous	TO 1-1A-1 par. 3.1.1
Cracks	A crack in a landing-gear member: the part is replaced. No crack is negligible until the damage limits are known; beyond repair boundaries it goes to engineering	AC 43.13-1B par. 9-4 g; TO 1-1A-1 Table 2-1, par. 3.11.3.6
Small nicks and cuts	On a landing-gear member they can be filed and burnished to a smooth contour, removing the stress concentration	AC 43.13-1B par. 9-4 g

 Educational reference only, not approved data. Always consult the applicable SRM, AMM, or AC 43.13-1B and your certifying authority.

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Item	Published rule	Source
Heat	Heavy continuous abrasive grinding can heat the metal enough to change it: if suspected, hardness or conductivity tests. Grinding cracks run at right angles to the grinding direction, shallow and sharp at the root	AC 43.13-1B pars. 6-136, 5-5 d (3)
High-strength steel	Heat-treated above Rockwell C40, 180 000 psi: mild abrasive mats, cloths and papers; a power tool is undesirable (overheating, notches); chemical removers are prohibited without engineering authorization (hydrogen embrittlement)	AC 43.13-1B par. 6-165
Shot peening	Peening is a way of producing compressive residual stress in a part; the sources print no intensity, coverage or media: —, the manufacturer's drawing or manual	AC 43.13-1B par. 6-39; TO 1-1A-1 app. C par. C.11

3 Repair

Protection after the blend

Step	Rule	Source
Conversion coat	MIL-C-81706 immediately after reworking; if 48 hours or more pass and no primer or paint has gone on, apply it again before going on	AC 43.13-1B par. 6-136 j
Primer	Epoxy primer MIL-P-23377 to a minimum dry-film thickness of 0.0012 in (US military repair practice); a manufacturer's system overrides it	TO 1-1A-1 par. 3.11.3.5
Where not to use the solutions	Not on magnesium or on steel of 180 000 psi and above: they must not contact those metals; no paint thinner, acetone or other combustible material near them	AC 43.13-1B par. 6-136 j (note)
Shot peening	—: intensity, coverage and media from the manufacturer's drawing or manual	AC 43.13-1B par. 6-39
Health and safety	Alodine and epoxy primer are toxic: eye and skin protection, good general ventilation	TO 1-1A-1 par. 3.11.3 (warning)

Worked example: three blends at 20 : 1

Case	Arithmetic	Result
Scratch 0.012 in deep on a 7075-T6 forged fitting, corrosion rule applied	20 × 0.012 = 0.240 in long	Dish 0.240 in long, 0.012 in deep, long axis along the load; SRM limit: —
Pit 0.030 in deep, critical area	20 × 0.030 = 0.600 in	0.600 in of dish; all pits left after removal blended out (AC 6-115 b)
Same scratch, depth 0.012 in measured before finishing and 0.018 in after	20 × 0.018 = 0.360 in against 0.240 in blended	The dish is too short: lengthen it to 0.360 in, then measure again
Depth after finishing 0.018 in, SRM rework limit —	The limit is the SRM's	Inside: finish, coat, record. Beyond: manufacturer or DER (AC 6-134 b)

1. Get the limit from the SRM.
2. Inspect before removing metal.
3. Remove the defect, shape the dish.
4. Finish to 400 grit; measure depth.
5. Conversion coat and primer at once.
6. Peening as the maker says; record.

Key points

- **SRM or drawing first:** blend allowance, depth limit and finish are theirs.
- **20 : 1** length to depth is the corrosion ratio (AC 6-115); mechanical damage: the SRM.
- **Ellipse** with its long axis along the principal load.
- **Steel above 180 000 psi:** no power tool, no chemical remover.
- **Crack in landing gear:** replace the part.

MAIN SOURCES · AC 43.13-1B with Change 1, Acceptable Methods, Techniques, and Practices · TO 1-1A-1 / NAVAIR 01-1A-1, General Manual for Structural Repair · 14 CFR Part 43, par. 43.9

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