



## Chemical Data Sheet N° CDS-15

**Title:** Preparation & Control of ASC-2N / Nitric Acid Stripping Solutions

**Related Procedure:** VAIL-OPS-039

**Revision:** 1      **Date:** 24<sup>th</sup> June 2022

### 1.0 Health, Safety & Environmental Considerations

Prior to handling ASC-2N/nitric acid solutions personnel must be familiar with the relevant MSDS and any COSHH assessments for these chemicals, refer to the 'sevron' database. The necessary precautions must be taken.

### 2.0 Product Specifications

*ASC-2N / Nitric Acid Stripping Solutions*

**CDS-15-1**      ASC-2N / Nitric Acid Stripping Solutions

CDS-15-1 / ASC-2N / Nitric Acid Stripping Solutions				
Product Details				
Process Solution Details				OEM / Manufacturers' Specifications
Description	OEM Reference <i>(if applicable)</i>	Solution Parameter	Operating Temp °C	
Nitric Acid (concentrated ~ 69%)	Vector ERI T56-7200-51 See NOTES <sup>1</sup>	62 – 78 ml/l (6.2 – 7.8 % vol)	27 - 32	Rolls-Royce T56/501 OHM (see NOTES <sup>1</sup> )
ASC-2N flakes		11 – 19 g/l		Vector ERI T56-7200-51
Max surface area to be processed		1577 cm <sup>2</sup> / 10 litres		Manufacturers' Technical Data Sheets
NOTES:				
<sup>1</sup> Covered by various T56/501 overhaul manuals including: TO 2J-T56-53 WP 207 00 / WP 208 00; TVL 2JA3-406-006-3 SECTION 10; Para 10.14 & NAVAIR 02B-5DH-6-2V1 WP 009 00 Para 35.				

### 3.0 Requirements Summary

#### 3.1. **DAILY**

*Local Operating Personnel*

Check extraction, temperature, level, agitation and that solution is not visibly contaminated before use.

#### 3.2. **PER BATCH**

*Local Operating Personnel*

Monitor the surface area of components being processed in the solution.

3.3.    **IF REQUIRED**

*Laboratory*

Qualify solution by carrying out metallurgical checks.

Check ASC-2N and nitric acid content by chemical analysis, not recommended.

**4.0    Process Tank Details**

Requirements for process tanks containing ASC-2N / nitric acid stripping solutions:

Process Tank material:	Suitable rigid plastic or plastic lined steel
Lids:	Yes, to minimise evaporation losses and reduce fumes
Fume extraction:	Yes
Heating system:	Yes, sufficient to achieve 27 – 32 °C
Temperature control:	Yes, thermocouple & electronic controller
Level indicators:	Yes, to prevent damage to heaters if level low
Timer:	Optional, to switch off heaters when not in use
Agitation:	Yes, compressed air agitation
Water inlet:	Optional, can use to top up losses due to evaporation
Drain:	No – these solutions must not enter effluent drains

**5.0    Product Preparation**

- 5.1.    The ASC-2N / nitric strip solution is prepared using concentrated commercial / technical grade nitric acid (~ 69%, SG 1.42) and ASC-2N:

$$ASC-2N \text{ required (kg)} = 15 * \text{tank volume } T \text{ (l)} / 1000$$

$$\text{nitric acid required (l)} = \text{tank volume } T \text{ (l)} * 0.07$$

- 5.2.    Fill tank to approximately 60 % of capacity with water, carefully dissolve the required amount of ASC-2N and stir thoroughly.
- 5.3.    Carefully add the required amount of nitric acid, stir thoroughly and make up to volume with water.
- 5.4.    To make up a typical 130 litre tank of ASC-2N / nitric acid strip solution:

Add ~ 80 litres of cold water to tank  
Dissolve 2 kg ASC-2N, stir thoroughly (for an ~ 15.4 g/l ASC-2N solution)  
Carefully add 8.5 litres of nitric acid (for an ~ 65 ml / litre nitric acid solution)  
Finally add approx 40 litres of cold water to top-up tank to working level

- 5.5.    Heat the solution to the required temperature before use.
- 5.6.    IF REQUIRED, Qualify the solution for production use by carrying out a metallurgical check as outlined below.

**NOTE:** *Certain nickel based alloys are prone to intergranular attack (IGA) in nitric acid solutions, this qualification is to demonstrate that the solution is both capable of stripping aluminised coatings (Alpak or AEP) and that it does not cause any IGA on the components.*

- 5.6.1.    Prepare a representative control specimen of the alloy to be stripped by selecting an aluminised (Alpak or AEP coated) scrap turbine blade, grind a flat (uncoated) surface on the convex aerofoil.

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- 5.6.2. Alumina grit (120/220) blast the specimen at  $50 \pm 5$  psi and suspend it in the heated & air agitated ASC-2N/nitric stripper for two hours.
- 5.6.3. Remove specimen from the solution, thoroughly rinse in cold water followed by hot water and dry with compressed air.
- 5.6.4. Blast specimen with 120/220 grit alumina at  $50 \pm 5$  psi.
- 5.6.5. Take a cross section from the specimen which includes the ground flat surface using a cut-off machine IAW ERI T56-7200-56.
- 5.6.6. Mount the section and prepare for metallurgical examination IAW ERI T56-7200-56.
- 5.6.7. Examine the specimen at 400 X - 500 X magnification in the as polished condition.
- 5.6.8. Check the flat (uncoated) surface for any evidence of intergranular attack (IGA), this is deemed present if most of the major grain boundaries show some attack. If required ferric etch the specimen and re-examine.
- 5.6.9. Check the coated surfaces for removal of aluminising.
- 5.6.10. If there is no evidence of IGA and the aluminising has been removed the ASC-2N / nitric stripping solution is qualified for use.
- 5.6.11. If there is evidence of IGA or if coating has not been sufficiently stripped the solution should be discarded and replaced or analysed for possible replenishment.
- 5.7. Record details of solution preparation including product quantities & GR numbers and solution qualification (if applicable) including micro reference electronically on MS Excel spreadsheet for process solution analysis records.

## 6.0 Product Maintenance

- 6.1. ASC-2N / nitric acid stripping solutions should be discarded and replaced when the specified surface area of components has been processed, when indicated by analysis or metallurgical control results or if the solution ceases to be effective. Chemical analysis and subsequent replenishment is optional and not recommended at Vector.
- 6.2. These solutions will gradually deteriorate over time even if not used, the initial blue colour will gradually darken as the solution becomes spent. Spent or ineffective solutions should be discarded and replaced.
- 6.3. The stripping solutions shall be checked if left for more than about a month, whether used or not.
- 6.3. Monitor surface area stripped.
  - 6.3.1. The surface area of the components stripped should be monitored by the local operating personnel as outlined in ERI T56-7200-51 and recorded as required on form VAIL-OPS-039F04 or an equivalent spreadsheet.
  - 6.3.2. The ASC-2N/nitric stripping solution should be discarded and replaced when  $20,500 \text{ cm}^2$  of aluminised surface / 130 litres of solution has been stripped.

## 7.0 Chemical Analysis Methods

If it is required to analyse the stripping solution for nitric acid and/or ASC-2N content, the methods outlined in the relevant T56/501 overhaul manuals (see above) should be used. Record any results electronically on MS Excel spreadsheet for process solution analysis records and make additions as outlined below.

## 8.0 Corrections & Additions

- 8.1. If necessary, replenish the ASC-2N / nitric stripping solution with concentrated nitric acid and/or ASC-2N as required (see also Para 5.0 Product Preparation above):

$$\text{nitric acid (HNO}_3\text{) req'd (l) = (70 - actual HNO}_3\text{ conc (ml/l)) * tank vol T (l) * 0.07}$$

$$\text{ASC-2N required (g) = \{req'd conc (g/l) - actual conc (g/l)\} * tank volume T}$$

- 8.2. Add the required amount of nitric acid and/or ASC-2N to the solution, if necessary remove some solution.
- 8.3. Record details of any additions electronically on MS Excel spreadsheet for process solution analysis records.

## 9.0 Disposal

Handle, store and dispose of waste ASC-2N / nitric acid solutions IAW Fleetlands local procedures for hazardous waste. Spent ASC-2N / nitric acid solutions may be transferred to suitable storage containers or IBCs for acidic waste prior to removal from site. Do not discharge to effluent drains.

## 10.0 Additional Requirements

n/a

**END.**