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# 009 Store Hot Tap & STOPPLE® Fittings: Inspections Report

Oct, 2015

Prepared for: **APA Group Ltd.**





To the attention of	contact person
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## 1. EXECUTIVE SUMMARY

This report presents the findings of recent inspections carried out on APA Group's hot tap and STOPPLE® fittings housed at 180 Greens Road, Dandenong South.

The inspections build on initial information gathered from an audit of the fittings conducted by TDW in March 2013.

Inspections were conducted on three occasions: April 29<sup>th</sup> at APA, Aug 1<sup>st</sup>-15<sup>th</sup> at TDW and Sept 22<sup>nd</sup> at APA. The results are compiled in this report.

The purpose of these recent inspections is to determine the serviceability of the fittings, in order to restore their readiness for use. Due to the old age of many of the fittings and lack of identifying markings, physical inspections were necessary to identify spares parts and determine their availability.

The inspections served an additional purpose of filling the gaps in the information on the fittings and verifying or correcting existing information.

In this report consideration is given to the following aspects of each individual fitting: presence of identifying markings (part number, maximum working pressure), drawing availability, spares availability, ease of servicing and utility of the fitting.

A summary of inspection results is provided in section 3, and full list of fittings in the appendix. From a total of 74 fittings, 22 have been serviced during Jul/Aug. 45 fittings are recommended for servicing, 6 fittings are recommended for scrapping, and 1 fitting has no LOCK-O-RING® flange and therefore doesn't need servicing.

A recommendation to scrap the fitting is given on the basis of lack of identification, difficulty of servicing, poor utility or a combination of these factors.

## 2. FITTINGS INSPECTION - OBJECTIVES

The inspections objective was to assess each fitting and answer the following queries:

- Is the part number of the fitting able to be verified?
- Is there a drawing available for the fitting and bill of materials for the parts?
- Is the rating of the fitting able to be verified ? ie: maximum working pressure (M.W.P.) from drawing or stamping.
- How difficult is the fitting to service?
- Can we source the required spares/consumables?
- How usable is the fitting in its current state? For instance is there a matching plug, is the fitting actually a flange only, is the fitting complete with no missing parts, are back up grooves installed?

### 2.1 Fitting Part Number

The part number of the fitting leads to the fitting drawings and therefore is critical to determine the fitting characteristics. On many fittings, the part number is stamped on the fitting sleeve. On many older fittings, there are no part number stampings, making a positive identification very difficult.

Additionally there is a flange part number which can be stamped on the face of the flange. The flange part number can also lead to identification of the segment parts within the flange.

### 2.2 Drawing Availability

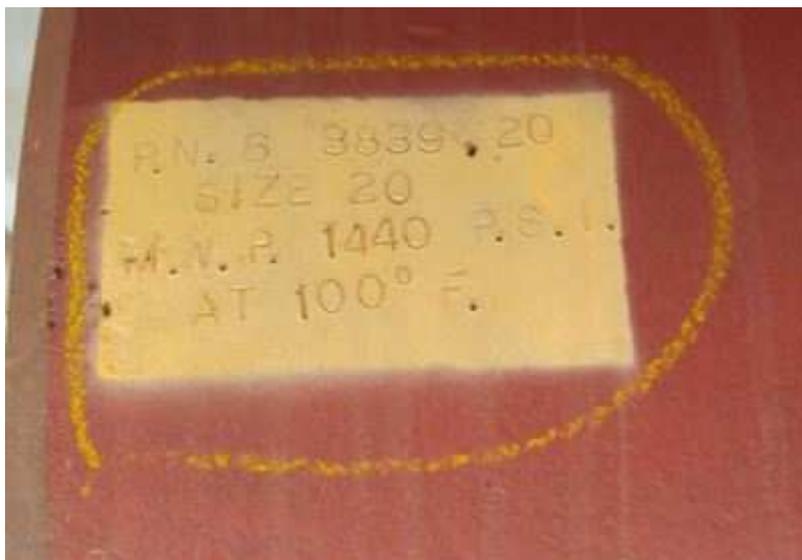
A complete suite of drawings would include a drawings of the entire fitting , the flange sub assembly, and a bill of materials listing. It's extremely rare that all of these drawings are available for old fittings. Drawings are retrieved by fitting part number or flange part number – if these identifications are not available then retrieving a drawing is impossible.

### 2.3 Maximum Working Pressure (M.W.P.)

In many cases the rated pressure (M.W.P.) of the fitting is stamped on the fitting with its reference temperature. It is stamped in the same location on the sleeve as the fitting part number. The M.W.P. is important as it can be less than the fitting flange rating.

M.W.P. can also be found on the drawing, if that is able to be retrieved.





**Fig 2.1** Example of Part Number and M.W.P. Stamping.

In some cases the flange has its own plate which denotes the size of the flange and its class.



**Fig 2.2** Flange plate

## 2.4 Ease of Servicing

To perform servicing of the fitting, access to the internal segment components is needed to replace the elastomer O-ring and lubricate the working parts. In older fittings, the design does not facilitate easy removal of the inner parts.

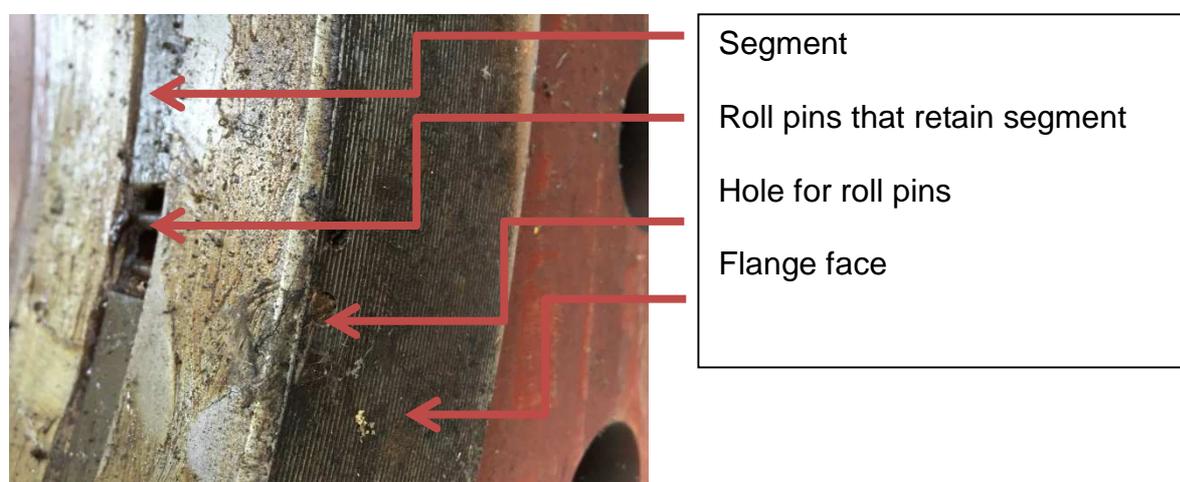
Ease of servicing is an important consideration in weighing whether to proceed with servicing. Increased difficulty means consuming greater time (and cost) to complete the servicing. **There is also a chance that the fitting segments cannot be removed and therefore servicing cannot be completed.**

The ease of servicing is mainly dependent on the design of the inner working parts that move the segment in and out.

The segment designs are broadly categorized into three types. For this report we will call them Types 1, 2 and 3.

**Type 1:** oldest design, which has long been obsolete. The segment arc and screw are two separate pieces, with the O-ring located on the screw.

In order to access the O-ring, the segment must be wound all the way in and then the roll pins that retain the segment from extending too far must be removed. The roll pins are not designed to be easy removed, as they are driven into a blind hole and flush at the flange face. Removal is only possible by gripping the roll pin in the segment groove and using manual leverage to remove. The age of fittings and sticking friction can make this a very difficult task.



**Fig 2.3** 30" fitting showing 2 roll pins that retain the segment arcs. This is a "type 1" fitting.

**Type 2:** Like Type 1, this is also an obsolete design. The segment arc and inner screw is a one-piece design (two pieces attached by a pin). The O-ring groove located on the shank of the screw. Like Type 1, the roll pins must be removed and the segment removed to access the O-ring.

The other distinction of Type 2, compared to Type 1, is that the pipe plug (which acts as an outer cap on the assembly) is now threaded into a reducing bush, instead of directly into the internal thread on the flange. This is an easy means of telling Type 1 design from the others.

**Type 3:** This is the modern design of segment internals, whereby it is not necessary to remove the roll pins and segment arc to access the O-ring. The segment screw containing the O-ring, can be removed through the outer bushing. Obviously this greatly increases serviceability with the added benefit of being able to replace a leaking O-ring in the field.

As mentioned, the Type 1 or 2 are more difficult to service due to the difficulty of extracting the roll pins. On 30" fitting there can be 7 segments, which requires 14 roll pins to be removed. Class 150 flanged fittings have thinner segment grooves, offering less leverage to remove the roll pins – also increasing the difficulty.

Refer to table 3.1 which shows whether the fitting is Type 1, 2 or 3. The same table shows our assessment of the difficulty of servicing the fitting, with a rating from 1 (easiest) to 5 (hardest).

**Fig 2.4: Segment Designs**



**Type 1**



**Type 2**



### Type 3: (segment not shown)

## 2.5 Availability of Required Consumables

Due to some obsolescence of fittings, particularly Type 1 and 2 (defined in section 2.4), the process of identification of spares is more challenging. Very old fittings are lacking drawings and bills of material. We therefore rely on physical identification and measurement to identify spares.

The metallic working parts of internal segments and segment screws are no longer available for obsolete fittings.

However, a valid assumption is that these parts have not been damaged or corroded due to the fittings entire life being spent indoors in appropriate storage conditions, with factory greasing of the internal parts. This would be verified during the servicing of the fittings by physical inspection, checking unimpeded movement of segments and pressure test to check the O-ring and groove integrity..

Therefore servicing would not require replacement of internal parts, with the exception of the internal O-ring, outer staked bushing and possibly roll pins. As long as these consumables can be sourced, the servicing of the fittings is possible.

The table 3.1 shows the availability of the required parts for servicing.

## 2.6 Utility of Fittings

The issue of utility of the fitting can be broken down as follows:

- Fitting is complete:
  - with matching plug, guide bars or scarfed nipple on plug
  - back up strip groove installed – as older fittings (Type 1 & 2) don't have back up strip groove, it is expected that they could be machined prior to using the fitting.

- Matching halves on sleeve.
- Features of the fitting which restrict its utility on transmission assets. For example, a flange only would be considered to have less utility than a full encirclement fitting. Fittings with class 150 or 300 flange would be suitable for fewer assets than class 600. These factors are a consideration for APA.

Section 3, summarizes the inspection results with regard to these points raised in section 2.

## 3. INSPECTION RESULTS

### 3.1 Summary of Inspection Results

The following table summarizes the points of section 2 and makes a recommendation on whether to proceed with the servicing.

Those fittings that are recommended not to proceed with servicing, are further collated in section 3.2 and the reasons given.

To assist with identification, an **item number** is provided for each type of fitting. The item numbers are displayed sequentially in the complete list of fittings in the appendix.



**Table 3.1 Summary of Inspection Results**

Item Number	TDW Part code	Description	Flange Part Code	Flange class	Fitting MWP (psi)	drawing retrieved Y/N	Segment Type (s.2.4)	Ease of Service		Back up strip groove	Matching Plug	Overhaul Spares available	Qty of Fittings	recommendation
								1	to 5					
13	06-0071-0000	LOCK-O-RING® flange 6"	N/A	600	N/A	N	1	4		N/A	TBA	Y	1	service
14	unknown	LOCK-O-RING® flange 8"	N/A	300	N/A	N	1	5		N/A	TBA	Y	2	scrap
15	06-1109-1812	Hot tap split tee 18" x 12" branch	unknown	unknown	unknown	N	1	4		N	TBA	Y	2	service, determine M.W.P.
16	unknown	Hot tap split tee 30" x 10" branch	06-0079-0000	600	unknown	Y (flange)	1	4		N	TBA	Y	2	service, determine M.W.P.
17	06-0954-0012	Hot tap split tee 16" x 12" branch	unknown	unknown	unknown	N	1	4		N	TBA	Y	2	service, determine M.W.P.
18	unknown	Hot tap split tee 30" x 18" branch	06-3154-3018	600	unknown	N	1	5		N	TBA	Y	2	service, determine M.W.P.
19	06-3839-0008	STOPPLE® split tee 8"	06-3776-0000	600	1440	Y	2	4		N	TBA	Y	1	service
20	06-3839-0012	STOPPLE® split tee 12"	06-3778-0000	600	1440	Y	2	4		N	TBA	TBA	2	Further Inspection
21	06-3839-0016	STOPPLE® split tee 16"	06-4055-0000	600	1440	Y	2	4		N	TBA	Y	4	service
22	06-3839-0020	STOPPLE® split tee 20", CL600	06-4057-0000	600	1440	Y	2	4		N	TBA	Y	2	service
23	06-6058-2008	Hot tap split tee 20" x 8" branch	unknown	600	1440	N	2	4		N	TBA	TBA	2	Further Inspection
24	06-6058-2408	Hot tap split tee 24" x 8" branch	unknown	600	1440	N	2	4		N	TBA	TBA	2	Further Inspection
25	06-6061-0024	STOPPLE® split tee 24"	unknown	600	1440	N	2	4		N	TBA	TBA	2	Further Inspection
26	06-6472-0460	STOPPLE® split tee, 4" CL 600	06-6423-0460	600	1440	Y	3	1		N	TBA	Y	4	service
27	06-6472-1260	STOPPLE® split tee 12"	06-6423-1260	600	1480	Y	3	1		N	TBA	Y	1	service
28	06-6472-1815	STOPPLE® split tee 18", CL150	06-6423-1815	150	275	Y	3	1		N	TBA	Y	1	service
29	06-6484-0020	STOPPLE® split tee 20"	unknown	600	1440	N	2	4		N	TBA	Y	2	service
30	06-6487-0024	STOPPLE® split tee 24"	unknown	600	1440	N	2	4		N	TBA	Y	2	service
32	06-6982-0000	STOPPLE® split tee 3"	06-6982-0001	600	1440	Y	3	1		N	TBA	Y	6	service
33	06-8807-0660	STOPPLE® split tee 6"	unknown	600	1440	N	3	1		N	TBA	Y	1	service
34	26-0406-0020	STOPPLE® split tee 20"	26-0406-0020-01	600	1480	Y	3	1		Y	TBA	Y	1	service
35	26-1129-3060	STOPPLE® split tee 30"	06-9815-3060-01	600	400	Y	3	1		Y	TBA	Y	1	service
37	26-0576-0806	Hot tap split tee 8" x 6'	unknown	600	1071	Y	N/A	N/A		Y	N/A	N/A	1	servicing not required
38	unknown	STOPPLE® split tee 30"	06-1221-30	600	unknown	N	1	5		N	TBA	Y	2	service, determine M.W.P.
39	unknown	hot tap split tee 12" x 8'	06-0075-0000	600	unknown	N	1	4		N	TBA	Y	2	scrap
40	06-3154-3018	18" LOCK-O-RING® flange	N/A	600	N/A	N	1	5		N/A	TBA	Y	1	scrap
11	unknown	hot tap split tee 18" x 8"	unknown	unknown	unknown	N	1	4		N	TBA	Y	1	scrap

**Notes on table:**

1. **“Unknown”** : Cannot be verified from markings on fitting or drawing.
2. **TBA:** TDW to advise.
3. **“Service, determine M.W.P.”** : Fitting can be serviced, but M.W.P is not known and must be determined by a suitable method, such as calculation.
4. **“Scrap”**: TDW recommends to scrap the fitting based on lack of information, poor utility or difficulty of servicing etc. More details provided in section 3.2
5. **“Further Inspection”**: Further inspection needed to identify parts. It's anticipated parts would be available, so this activity can occur at the same time as the servicing.
6. **“Service”** : Recommend for servicing.

### 3.2 Consideration of Fittings to Scrap

The following fittings are recommended by TDW to be scrapped. The fittings are listed here and the rationale provided for this course of action.

Item Number (ref table 3.1)	Part Code	Description	Flange Code	N/A
			Flange Class	300
			Fitting M.W.P	N/A
14	<b>Unknown</b>	<b>8" LOCK-O-RING FLANGE</b>		
				
<b>Drawing Availability</b> <b>No</b>		<b>Ease of service</b> <b>5 - difficult</b>		<b>Utility</b> <b>LOW</b> Class 300 flange only, obsolete design
<b>Comments</b> This is a very old class 300 flange of obsolete design, with no available drawing. Fitting inspection revealed very difficult to service, it is recommended to scrap this fitting.				

Item Number (ref table 3.1)	Part Code	Description	Flange Code	<b>Unknown</b>
			Flange Class	<b>Unknown</b>
			Fitting M.W.P	<b>Unknown</b>
11	<b>Unknown</b>	<b>18" x 8" HOT TAP SPLIT TEE</b>		
				
<b>Drawing Availability</b> <b>No</b>		<b>Ease of service</b> <b>4 - difficult</b>		<b>Utility</b> <b>LOW</b> Unknown MWP, no back up strip groove.
<b>Comments</b> This is a very old hot tap fitting, with no identifying markings nor available drawing. It is recommended to scrap this fitting.				



Item Number (ref table 3.1)  <b>40</b>	Part Code  <b>06-3154-3018</b>	Description  <b>18" LOCK-O-RING FLANGE</b>	Flange Code	N/A
			Flange Class	600
			Fitting M.W.P	<b>Unknown</b>
				
Drawing Availability <b>No</b>		Ease of service <b>5 - difficult</b>	Utility <b>LOW</b> : Flange only	
Comments This is an old design flange. Inspection revealed high difficulty of servicing. Low utility as flange only.				

Item Number (ref table 3.1)  <b>39</b>	Part Code  <b>Unknown</b>	Description  <b>12" x 8" HOT TAP SPLIT TEE</b>	Flange Code	06-0075-0000
			Flange Class	600
			Fitting M.W.P	<b>Unknown</b>
				
Drawing Availability <b>No</b>		Ease of service <b>4 - difficult</b>	Utility <b>LOW</b> Unknown MWP, no back up strip groove.	
Comments This is a very old hot tap fitting, with no part number nor available drawing. M.W.P not verifiable. It is recommended to scrap this fitting.				

## 4. FOLLOWING ACTIONS AND CONCLUSION

### 4.1 Following Actions

#### 4.1.1 Proceed with Servicing

We recommend proceeding with servicing for the fittings nominated in table 3.1. This will firstly involve ordering in the required spare parts. Then servicing the fittings at TDWA premises.

As mentioned in section 2.4 the servicing of these remaining fittings can expect to take substantially longer than the fittings serviced in the first batch, due to the greater difficulty in removing the segment internals from type 1 and type 2 fittings. There is also some chance that removal of the segments of certain fittings will prove extremely difficult, as has been revealed during the inspections.

Please see section 4.2 below for budget pricing on servicing and consumables.

#### 4.1.2 Determine Maximum Working Pressure

For some fittings we were unable to verify maximum working pressure (M.W.P.) on the fitting. This is the case if the M.W.P. is not marked on the fitting nor fitting drawing available. M.W.P. should be determined as a priority, using a suitable method such as an engineering calculation. A suggestion is for a calculation to be performed by APA engineers or by an engineering consultant.

#### 4.1.3 Consider Scrapping Some Fittings

It is our recommendation to scrap a handful of fittings, see table 3.1. Due to age, lack of identification and poor utility, difficulty of servicing or combination of these, we offer that recommendation.

Please see section 4.2 below for budget pricing on replacement fittings.

#### 4.1.4 Match Plugs with Fittings

The fittings should be stored together with their plugs and currently this is not the case for all fittings. An exercise in matching the fitting with its respective plug should be carried out. The plug should to be identified by part number. This will allow the correct O-ring to be obtained. An alternative is to measure the O-ring using a suitable method.



## 4.2 Pricing

The following are estimates for budgeting purposes and subject to variation.

		\$ unit	qty	\$
1	Spare parts for servicing of fittings. Include viton/FKM O-rings and bushings as applicable.			\$10,000
2	Labour cost to service LOCK-O-RING® segments on 45 fittings. Based on \$1250 /day			\$35,000
<b>Total servicing</b>				<b>\$45,000</b>
<b>Replacements for fittings recommend to be scrapped.</b>				
3	<b>Item 14</b> , 8" 600# Flange, LOCK-O-RING® Plus. Includes LOCK-O-RING® Plus plug with scarfed nipple.	\$5158	2	\$10,316
4	<b>Item 11</b> , 18" x 8" 600# Full encirclement Hot Tap Split Tee, LOCK-O-RING® Plus flange and plug with scarfed nipple.	\$12,131	1	\$12,131
5	<b>Item 40</b> , 18" Flange, 600# LOCK-O-RING® Plus. Includes LOCK-O-RING® Plus plug with scarfed nipple.	\$6393	1	\$6393
6	<b>Item 39</b> , 12" x 8" 600# Full encirclement Hot Tap Split Tee, LOCK-O-RING® Plus flange and plug with scarfed nipple.	\$17,578	2	\$35,156
7	18" welder qualification test piece, 300mm length	\$2436	1	\$2436
8	12" welder qualification test piece, 300mm length	\$6806	1	\$6806
<b>Total fittings</b>				<b>\$73,238</b>
<b>Grand Total servicing and replacement fittings</b>				<b>\$118,238</b>

Item 2 fittings servicing is based on estimated labour hours.

## 4.3 Concluding Remarks

To conclude this report we have the following remarks:

- As is well known, many of the fittings in Dandenong Stores are old and have been determined by inspection to be of an obsolete design. Servicing of the fittings, however is still possible, due to the availability of key consumables such as O-rings, bushings and pins.
- TDW has summarised the characteristics of the fitting including: part code, maximum working pressure and flange class. Also an assessment for ease of servicing, availability of spares, and utility of the fitting once serviced is offered. It



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is anticipated this summary will help APA make decisions on the overhaul of the fittings.

#### **4.4 Contact Details**

For any queries on this report, please contact T.D. Williamson, Australia:

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## 5.APPENDIX – LIST OF FITTINGS

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Fittings at APA Dandenong - serviceability  
as at October 13, 2015

Item Number	TDW Part code	Description	Flange Part Code	Flange class	Fitting MWP (psi)	drawing retrieved Y/N	Segment Type (section2.4)	Ease of Service 1 to 5	Back up strip groove	Matching Plug	Overhaul Spares available	overall qty of fittings	recommendation
<b>FITTINGS</b>													
1	06-6423-0460	LOCK-O-RING® flange 4"	N/A	600	N/A	Y	3	N/A	N/A	TBA	Y	2	servicing complete
2	26-0698-1060	STOPPLE® split tee 10"	06-6423-1060-01	600	1480	Y	3	N/A	Y	TBA	Y	2	servicing complete
3	26-0741-0860	STOPPLE® split tee 8"	06-6423-0860-01	600	1071	Y	3	N/A	Y	TBA	Y	3	servicing complete
4	26-1189-0604	Hot tap split tee 6" x 4" branch	26-1189-0604-02	600	1480	Y	3	N/A	Y	TBA	Y	2	servicing complete
5	26-1189-0806	Hot tap split tee 8" x 6" branch	26-1189-1006-02	600	1480	Y	3	N/A	Y	TBA	Y	2	servicing complete
6	26-1189-1006	Hot tap split tee 10" x 6" branch	26-1189-1006-02	600	1480	Y	3	N/A	Y	TBA	Y	2	servicing complete
7	26-1532-0460	LOCK-O-RING® flange 4"	N/A	600	N/A	Y	3	N/A	N/A	TBA	Y	2	servicing complete
8	26-2176-0660	LOCK-O-RING® flange 6"	N/A	600	N/A	Y	3	N/A	N/A	TBA	Y	2	servicing complete
9	26-0919-0660	LOCK-O-RING® flange 6"	N/A	600	N/A	Y	3	N/A	N/A	TBA	Y	1	servicing complete
10	36-1488-1808	Hot tap split tee 18" x 8" branch	06-6423-0860-01	600	1075	Y	3	N/A	Y	TBA	Y	1	servicing complete
11	unknown	Hot tap split tee 18" x 8" branch	unknown	unknown	unknown	N	1	4	N	TBA	Y	1	TDW recommend to scrap
12	36-1239-1860	STOPPLE® split tee 18"	06-8827-1860-01	600	1071	Y	3	N/A	Y	TBA	Y	1	servicing complete
13	06-0071-0000	LOCK-O-RING® flange 6"	N/A	600	N/A	N	1	4	N/A	TBA	Y	1	able to service, determine MWP
14	unknown	LOCK-O-RING® flange 8"	N/A	300	N/A	N	1	5	N/A	TBA	Y	2	TDW recommend to scrap
15	06-1109-1812	Hot tap split tee 18" x 12" branch	unknown	unknown	unknown	N	1	4	N	TBA	Y	2	able to service, determine MWP
16	unknown	Hot tap split tee 30" x 10" branch	06-0079-0000	600	unknown	Y (flange)	1	4	N	TBA	Y	2	able to service, determine MWP
17	06-0954-0012	Hot tap split tee 16" x 12" branch	unknown	unknown	unknown	N	1	4	N	TBA	Y	2	able to service, determine MWP
18	unknown	Hot tap split tee 30" x 18" branch	06-3154-3018	600	unknown	N	1	5	N	TBA	Y	2	able to service, determine MWP
19	06-3839-0008	STOPPLE® split tee 8'	06-3776-0000	600	1440	Y	2	4	N	TBA	Y	1	able to service
20	06-3839-0012	STOPPLE® split tee 12"	06-3778-0000	600	1440	Y	2	4	N	TBA	TBA	2	Further Inspection
21	06-3839-0016	STOPPLE® split tee 16"	06-4055-0000	600	1440	Y	2	4	N	TBA	Y	4	able to service
22	06-3839-0020	STOPPLE® split tee 20"	06-4057-0000	600	1440	Y	2	4	N	TBA	Y	2	able to service
23	06-6058-2008	Hot tap split tee 20" x 8" branch	unknown	600	1440	N	2	4	N	TBA	TBA	2	Further Inspection
24	06-6058-2408	Hot tap split tee 24" x 8" branch	unknown	600	1440	N	2	4	N	TBA	TBA	2	Further Inspection
25	06-6061-0024	STOPPLE® split tee 24"	unknown	600	1440	N	2	4	N	TBA	TBA	2	Further Inspection
26	06-6472-0460	STOPPLE® split tee, 4"	06-6423-0460	600	1440	Y	3	1	N	TBA	Y	4	able to service
27	06-6472-1260	STOPPLE® split tee 12"	06-6423-1260	600	1480	Y	3	1	N	TBA	Y	1	able to service
28	06-6472-1815	STOPPLE® split tee 18", CL150	06-6423-1815	150	275	Y	3	1	N	TBA	Y	1	able to service
29	06-6484-0020	STOPPLE® split tee 20"	unknown	600	1440	N	2	4	N	TBA	Y	2	able to service
30	06-6487-0024	STOPPLE® split tee 24"	unknown	600	1440	N	2	4	N	TBA	Y	2	able to service
31	06-6860-0006	Three-way tee 10"	06-6423-1060	600	1440	Y	3	N/A	N	TBA	Y	1	servicing complete
32	06-6982-0000	STOPPLE® split tee 3"	06-6982-0001	600	1440	Y	3	1	N	TBA	Y	6	able to service
33	06-8807-0660	STOPPLE® split tee 6"	unknown	600	1440	N	3	1	N	TBA	Y	1	able to service

Item Number	TDW Part code	Description	Flange Part Code	Flange class	Fitting MWP (psi)	drawing retrieved Y/N	Segment Type (section 2.4)	Ease of Service 1 to 5	Back up strip groove	Matching Plug	Overhaul Spares available	overall qty of fittings	recommendation
34	26-0406-0020	STOPPLE® split tee 20"	26-0406-0020-01	600	1480	Y	3	1	Y	TBA	Y	1	able to service
35	26-1129-3060	STOPPLE® split tee 30"	06-9815-3060-01	600	400	Y	3	1	Y	TBA	Y	1	able to service
36	06-8807-1860	STOPPLE® split tee 18"	unknown	600	1440	N	3	N/A	Y	TBA	Y	1	servicing complete
37	26-0576-0806	Hot tap split tee 8" x 6" branch	unknown	600	1071	Y	N/A	N/A	N/A	N/A	N/A	1	servicing not required, no segments
38	unknown	STOPPLE® split tee 30"	06-1221-30	600	unknown	N	1	5	N	TBA	Y	2	able to service, determine MWP
39	unknown	hot tap split tee 12" x 8"	06-0075-0000	600	unknown	N	1	4	N	TBA	Y	2	TDW recommend to scrap
40	06-3154-3018	18" LOCK-O-RING® Flange	N/A	600	N/A	N	1	5	N/A	TBA	Y	1	TDW recommend to scrap
											<b>total fittings quantity</b>	<b>74</b>	
<b>PLUGS</b>													
41	07-0312-0001	LOCK-O-RING® plug 4"	N/A	N/A	N/A	Y	N/A	N/A	N/A	N/A	N/A	9	to be matched with fitting
42	07-1265-0000	LOCK-O-RING® plug 6"	N/A	N/A	N/A	Y	N/A	N/A	N/A	N/A	N/A	6	to be matched with fitting
43	07-0293-0901	LOCK-O-RING® plug 24"	N/A	N/A	N/A	N	N/A	N/A	N/A	N/A	N/A	1	to be matched with fitting
44	07-1270-0012	LOCK-O-RING® plug 12"	N/A	N/A	N/A	Y	N/A	N/A	N/A	N/A	N/A	2	to be matched with fitting
45	07-1270-0072	LOCK-O-RING® plug 16"	N/A	N/A	N/A	N	N/A	N/A	N/A	N/A	N/A	1	to be matched with fitting
46	13-0025-1023	LOCK-O-RING® plug 30"	N/A	N/A	N/A	N	N/A	N/A	N/A	N/A	N/A	2	to be matched with fitting
47	07-0129-0117	Flow thru plug 18"	N/A	N/A	N/A	Y	N/A	N/A	N/A	N/A	N/A	1	to be matched with fitting
48	unknown	LOCK-O-RING® plug 10"	N/A	N/A	N/A	N	N/A	N/A	N/A	N/A	N/A	8	to be matched with fitting
49	unknown	LOCK-O-RING® plug 12"	N/A	N/A	N/A	N	N/A	N/A	N/A	N/A	N/A	10	to be matched with fitting
50	unknown	LOCK-O-RING® plug 14"	N/A	N/A	N/A	N	N/A	N/A	N/A	N/A	N/A	3	to be matched with fitting
51	unknown	LOCK-O-RING® plug 16"	N/A	N/A	N/A	N	N/A	N/A	N/A	N/A	N/A	4	to be matched with fitting
52	unknown	LOCK-O-RING® plug 18"	N/A	N/A	N/A	N	N/A	N/A	N/A	N/A	N/A	2	to be matched with fitting
53	unknown	LOCK-O-RING® plug 20"	N/A	N/A	N/A	N	N/A	N/A	N/A	N/A	N/A	2	to be matched with fitting
54	unknown	LOCK-O-RING® plug 24"	N/A	N/A	N/A	N	N/A	N/A	N/A	N/A	N/A	2	to be matched with fitting
55	unknown	LOCK-O-RING® plug 30"	N/A	N/A	N/A	N	N/A	N/A	N/A	N/A	N/A	1	to be matched with fitting
56	unknown	LOCK-O-RING® plug 8"	N/A	N/A	N/A	N	N/A	N/A	N/A	N/A	N/A	14	to be matched with fitting
											<b>total plugs quantity</b>	<b>68</b>	

**Notes on table:**

1. **“Unknown”** : Cannot be verified from markings on fitting or drawing.
2. **TBA**: TDW to advise.
3. **“Able to Service, determine M.W.P.”** : Fitting can be serviced, but M.W.P is not known and must be determined by a suitable method, such as calculation.
4. **“TDW recommend to Scrap”**: TDW recommends to scrap the fitting based on lack of information, poor utility or difficulty of servicing etc. More details provided in section 3.2
5. **“Further Inspection”**: Further inspection needed to identify parts. It’s anticipated parts would be available, so this activity can occur at the same time as the servicing.
6. **“Able to Service”** : Recommend for servicing.