



DDS Investments LLC.

# Superior Products

## Thread Inspection Guidelines for Superior Top Flow Quick Opening Closures

### Note

This document is provided as a guideline for field personnel to assess the integrity of threaded connection of superior entry closures. (Hub and Cap) The procedures outlined below shall be used in conjunction with a scheduled inspection. Superior Products recommends these inspections after 12 months of service, and 12 months thereafter. Declining thread integrity will vary with type of service and frequency of use. Damaged threads occur for several reasons.

These causes include:

- A. Yielded thread form due to excessive pressure.
- B. Thread wear due to excessive use.
- C. Surface corrosion.
- D. Galling of thread contact surfaces.
- E. Thread damage from rough handling.
- F. Cracks in threaded areas.

### Definitions

- 1. Full-form thread: The thread profile defined by the gage for that specific thread form.
- 2. Hub thread: The male thread machined on outside diameter of hub body.
- 3. Cap thread: The female thread machined on the inside of the closure cap.
- 4. Lead-in thread: The first thread to engage. Not full thread form.
- 5. Exit thread: Last thread from machining process. Not engaged threads and not full form.
- 6. Minor thread wear or damage: Affects less than 5% of the combined hub and cap full-form thread length.
- 7. Moderate thread wear or damage: Affects than 5 - 10% of the combined hub and cap full-form thread length.
- 8. Major thread wear or damage: Affects more than 10% of the combined hub and cap full-form thread length.

Outlined below is a procedure defining closure thread inspections to evaluate the integrity of the entry.

1. Record general information – Section 1 Data Sheet (Location, Serial No., Date, etc.)
2. Eliminate entry tee pressure per customer site operating procedures.
3. Remove closure cap from hub.
4. Thoroughly clean threads of closure hub and cap before inspection. Thread roots must be clean to inspect for cracks.
5. Adequately clean cap exterior to inspect for cracks around lugs. Lug area cracks necessitate closure replacement.
6. Visually inspect thread roots for cracks. If present, closure should be removed from service. Liquid penetrant may be used to confirm cracks which may appear insignificant.
7. Visually inspect threads for damage due to corrosion, galling, handling damage and wear. See Figure 2.
8. Identify correct closure thread form - See Table 1.
9. Use the thread profile template (See Table 3.) to indicate wear to the full-thread portion of both hub and cap. Amount of thread wear will be displayed as increasing gaps on flanks of threads. These gaps should be measured at four points per thread (12, 3, 6, and 9 O'clock). Incomplete lead-in and exit threads need not be measured. Any significant gap should be measured with wire style pin gauges (See Table 3.) to indicate amount of wear present. For Maximum Allowable Gaps - See Table 2.
10. Inspect thread surfaces for loss of metal due to corrosion. These areas should be gauged using template and pin gauges to determine loss. See Table 2.

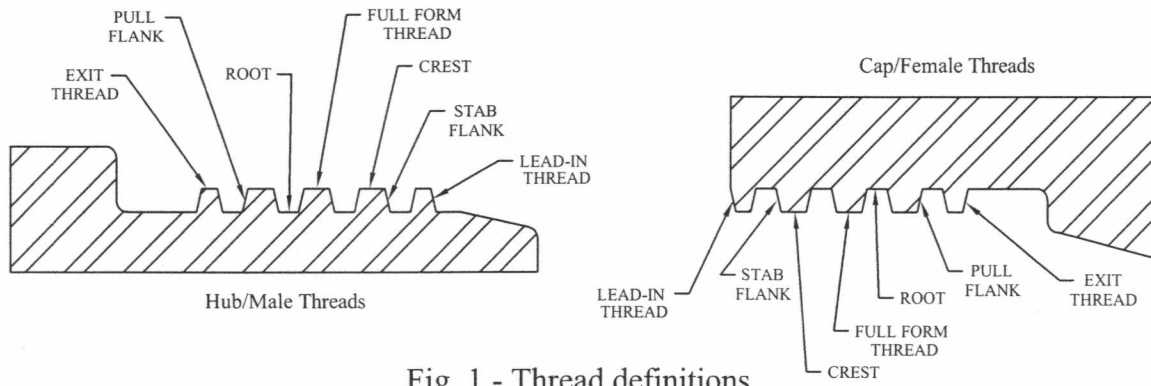


Fig. 1 - Thread definitions

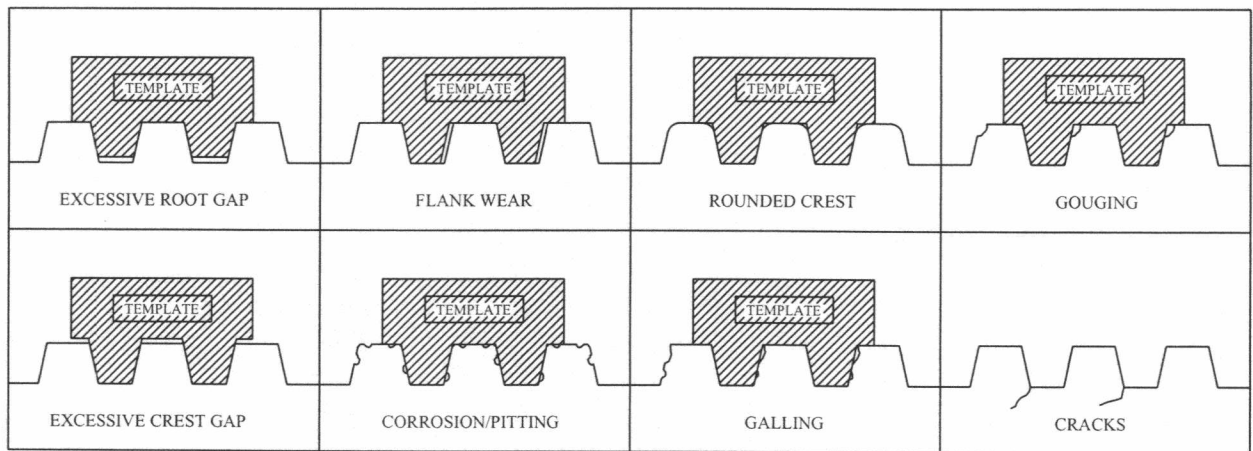
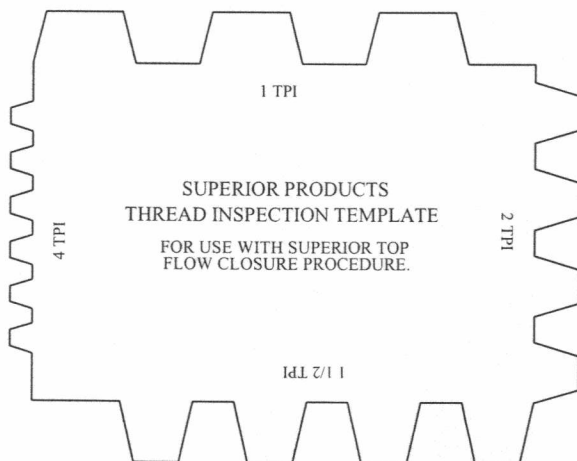


Fig. 2 - Examples of Thread Wear or Damage



Note: Shown Is a Thread Profile Template Containing Profiles Used on Superior Closures. This Template Allows Users to Visually Compare Threads to Standard Machined Thread Form Dimensions.

Fig. 3 - Thread Profile Template

Table 1 - Superior Products Thread forms and Classes

Closure Size	Thread Designation	Thread Profile
2"	3.438-4 Modified Stub Acme 2G	.136w x .095h
3"	4.750-4 Modified Stub Acme 2G	.136w x .095h
4"	5.625-4 Modified Stub Acme 2G	.136w x .095h
6"	8.250-2 Modified Stub Acme 2G	.265w x .197h
8"	10.000-2 Modified Stub Acme 2G	.265w x .197h
10"	12.000-2 Modified Stub Acme 2G	.265w x .197h
12"	14.375-2 Modified Stub Acme 2G	.265w x .197h

Table 2 - Maximum Allowable Gap Measurements

Note: Gaps That Exceed Values Below And Are Present In Excess Of 10% Of The Combined Hub And Cap Full Form Thread Length, The Closure Requires Prompt Replacement.

Threads Per Inch	150 ANSI	300 ANSI	600 ANSI	900 ANSI
2 TPI	.025	.015	.015	.015
4 TPI	.050	.030	.030	.020

Table 3 - Thread Profile Template and Pin gauges

Description	Gauge Part No.
Complete Inspection Set	TC-INS-001
Thread Profile Template	TC-INS-002
Pin Gauge - .010	TC-INS-003
Pin Gauge - .015	TC-INS-004
Pin Gauge - .020	TC-INS-005
Pin Gauge - .025	TC-INS-006
Pin Gauge - .030	TC-INS-007
Pin Gauge - .050	TC-INS-008

## Superior Products Closure Thread Inspection Data Sheet

### General Information

Closure Location: \_\_\_\_\_  
 Customer/Company: \_\_\_\_\_  
 Closure Serial No.: \_\_\_\_\_  
 Years/Months of Service: \_\_\_\_\_  
 Inspection Date: \_\_\_\_\_  
 Inspected by: \_\_\_\_\_

### Closure Size

Closure Part No./Size - Check 1

NPS2 - 2" <input type="checkbox"/>	NPS8 - 8" <input type="checkbox"/>
NPS3 - 3" <input type="checkbox"/>	NPS10 - 10" <input type="checkbox"/>
NPS4 - 4" <input type="checkbox"/>	NPS12 - 12" <input type="checkbox"/>
NPS6 - 6" <input type="checkbox"/>	

### Closure ANSI Rating

ANSI 150 <input type="checkbox"/>	ANSI 300 <input type="checkbox"/>
ANSI 600 <input type="checkbox"/>	ANSI 900 <input type="checkbox"/>

### General Closure Hub/Cap Condition

Very Good <input type="checkbox"/>	Poor <input type="checkbox"/>
Fair <input type="checkbox"/>	Visible Cracks * <input type="checkbox"/>

Comments: \_\_\_\_\_  
 \_\_\_\_\_

### Thread Flank Gap Measurements

Hub Max. Gap \_\_\_\_\_ Cap Max. Gap \_\_\_\_\_

Hub Min. Gap \_\_\_\_\_ Cap Min. Gap \_\_\_\_\_

Percentage of Linear Thread Length Exceeding Gap Table Below: \_\_\_\_\_

Threads Per Inch	150 ANSI	300 ANSI	600 ANSI	900 ANSI	Threads Meet Criteria <input type="checkbox"/>
2 TPI	.025	.015	.015	.015	Replace Closure <input type="checkbox"/>
4 TPI	.050	.030	.030	.020	

Note: Gaps That Exceed Values Above And Are Present In Excess Of 10% Of The Combined Hub And Cap Full Form Thread Length, The Closure Requires Prompt Replacement. A Combination of Conditions (5% Thread Wear + Corrosion + Damage + extended or unknown time in service) could also Indicate Closure Replacement if evident on Inspection.

\* Any Visual Cracks Present Requires Closure Replacement.

Inspector Signature: \_\_\_\_\_