Package 'AQLSchemes'

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Type Package

Title Retrieving Acceptance Sampling Schemes

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Description

Functions are included for recalling AQL (Acceptable Quality Level or Acceptance Quality Level)
Based single, double, and multiple attribute sampling plans from the Military Standard (MIL-
STD-105E) - American
National Standards Institute/American Society for Quality (ANSI/ASQ Z1.4) tables and for re-
trieving variable
sampling plans from Military Standard (MIL-STD-414) -
American National Standards Institute/American Society
for Quality (ANSI/ASQ Z1.9) tables. The sources for these ta-
bles are listed in the URL: field. Also included
are functions for computing the OC (Operating Characteristic) and ASN (Average Sample Num-
ber) coordinates
for the attribute plans it recalls, and functions for computing the estimated proportion noncon-
forming and
the maximum allowable proportion nonconforming for variable sampling plans. The MIL-
STD AQL Sampling schemes
were the most used and copied set of standards in the world. They are in-
tended to be used for sampling a stream
of lots, and were used in contract agreements between supplier and customer compa-
nies. When the US military
dropped support of MIL-
STD 105E and 414, The American National Standards Institute (ANSI) and the International
Standards Organization (ISO) adopted the standard with few changes or no changes to the cen-
tral tables. This
package is useful because its computer implementation of these tables duplicates that avail-
able in other
commercial software and subscription online calculators.

URL https://archive.org/details/MIL-STD-105E_1

https://archive.org/details/MIL-STD-414

License GPL-2

LazyLoad yes

Suggests R.rsp

VignetteBuilder R.rsp

NeedsCompilation no

Repository CRAN

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AQLSchemes-package   *This package contains functions to recall MIL-STD-105E - ANSI/ASQ Z1.4, and the MIL-STD-414 - ANSI/ASQ Z1.9 Variable Sampling Plans from the Public Domain Published Tables*

Description

The **AAQLSchemes** package provides a functions to recall MIL-STD-105E - ANSI/ASQ Z1.4 - ISO2859-1 and MIL-STD-414 - ANSI Z1.9 - ISO3951-1 Sampling Plans from Published Tables.

Details

Package:	AQLSchemes
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```
          Dependencies:
          LazyLoad:      yes
          Packaged:      2023-09-06 19:54:07 UTC; Lawson
          Built:         R 3.5.1; i386-pc-mingw32; 2011-03-22 19:54:08 UTC; windows
```

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OCASNZ4S      Calculates the OC values for an attribute single sampling plan
OCASNZ4D    Calculates the OC and ASN values for an attribute double sampling plan
OCASNZ4M    Calculates the OC and ASN values for an attribute multiple sampling plan
```

Author(s)

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```
AADouble              This function recalls MIL-STD-105E - ANSI/ASQ Z1.4 Double Sam-
                      pling Plans from the published tables.
```

Description

This function calls the function AAZ14Double function that queries the user for the inspection level, lotsize, and AQL, and then it recalls the appropriate sample sizes, acceptance numbers and rejection numbers and returns a data frame with two rows and three columns.

Usage

```
AADouble(type)
```

Arguments

type   type is either 'Normal', 'Tightened' or 'Reduced' to specify which type sam-
                pling plan is desired.

Value

returns a data frame with two rows and three columns

Note

This function calls the function AAZ14Double to get the specifications and recall and return the plan in a data frame.

Author(s)

John S. Lawson <lawson@byu.edu>

References

<https://archive.org/details/MIL-STD-105E_1>

AAMultiple	*This function recalls MIL-STD-105E - ANSI/ASQ Z1.4 Multiple Sampling Plans from the published tables.*

Description

This function calls the function AAZ14Multiple function that queries the user for the inspection level, lotsize, and AQL, and then it recalls the appropriate sample sizes, acceptance numbers and rejection numbers and returns a data frame.

Usage

```
AAMultiple(type)
```

Arguments

type   type is either 'Normal', 'Tightened' or 'Reduced' to specify which type sampling plan is desired.

Value

returns a data frame with seven rows and three columns

Note

This function calls the function AAZ14Multiple to get the specifications and recall and print the plan.

Author(s)

John S. Lawson <lawson@byu.edu>

References

<https://archive.org/details/MIL-STD-105E_1>

AASingle | *This function recalls MIL-STD-105E - ANSI/ASQ Z1.4 Single Sampling Plans from the published tables.*

Description

This function calls the function AAZ14Single function that queries the user for the , inspection level, lotsize, and AQL, and then recalls and prints the appropriate sample sizes, acceptance numbers and rejection numbers and returns a data frame.

Usage

```
AASingle(type)
```

Arguments

type   type is either 'Normal', 'Tightened' or 'Reduced' to specify which type sampling plan is desired.

Value

returns a data frame with one row and three columns

Note

This function calls the function AAZ14Single to get the specifications and recall and print the plan.

Author(s)

John S. Lawson <lawson@byu.edu>

References

<https://archive.org/details/MIL-STD-105E_1>

AAZ14Double | *This function queries the user for the specs and recalls MIL-STD-105E - ANSI/ASQ Z1.4 Double Sampling Plans from the published tables.*

Description

This function is called by the function AADouble function.

Usage

```
AAZ14Double(PLAN, INSL, LOTS, AQL)
```

Arguments

`PLAN`	PLAN is the plan type 1=normal, 2=Tightened, 3=reduced.
`INSL`	INSL is the inspection level, 1-7.
`LOTS`	LOTS is the lot size, 1-15.
`AQL`	AQL is the Acceptance Quality Level, 1-26.

Value

returns a data frame with two rows and three columns

Note

This function is called by the function AADouble.

Author(s)

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AAZ14Multiple	*This function queries the user for the specs and recalls MIL-STD-105E - ANSI/ASQ Z1.4 Multiple Sampling Plans from the published tables.*

Description

This function is called by the function AAMultiple function.

Usage

```
AAZ14Multiple(PLAN, INSL, LOTS, AQL)
```

Arguments

`PLAN`	PLAN is the plan type 1=normal, 2=Tightened, 3=reduced.
`INSL`	INSL is the inspection level, 1-7.
`LOTS`	LOTS is the lot size, 1-15.
`AQL`	AQL is the Acceptance Quality Level, 1-26.

Value

returns a data frame with seven rows and three columns

Note

This function is called by the function AAMultiple.

Author(s)

John S. Lawson <lawson@byu.edu>

| AAZ14Single | *This function queries the user for the specs and recalls MIL-STD - ANSI/ASQ Z1.4 Double Sampling Plans from the published tables.* |

Description

This function is called by the function AASingle function.

Usage

```
AAZ14Single(PLAN, INSL, LOTS, AQL)
```

Arguments

PLAN	PLAN is the plan type 1=normal, 2=Tightened, 3=reduced.
INSL	INSL is the inspection level, 1-7.
LOTS	LOTS is the lot size, 1-15.
AQL	AQL is the Acceptance Quality Level, 1-26.

Value

returns a data frame with one row and three columns

Note

This function is called by the function AASingle.

Author(s)

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AAZ19   *This function queries the user for the specs and recalls MIL-STD-414*
                             variable sampling plans from the published tables.

Description

This function recalls Normal, Tightened and Reduced Plans including the sample size n, acceptability constant (k), and the maximum proportion nonconforming allowable M.

Usage

```
AAZ19(type,stype,INSL,LOTS,AQL)
```

Arguments

type	type is the plan type 'Normal', 'Tightened', or 'Reduced', Normal is Default.
stype	stype is "known" or "unknown", unknown is Default
INSL	INSL is 1-5
LOTS	LOTS is 1-16
AQL	AQL is 1-11

Value

returns a vector of length 3 containing the sample size (n), acceptability constant (k), and the maximum proportion nonconforming allowable (M)).

Author(s)

John S. Lawson <lawson@byu.edu>

References

<https://archive.org/details/MIL-STD-414>

EPn   *This function calulates the estimated proprtion non-conforming.*

Description

This function calulates the estimated proprtion non-conforming with sigma unknown or known using the standardized distribution.

Usage

```
EPn(sample,sided,stype,LSL,USL,sigma,xbar,s,n)
```

Arguments

`sample`	sample is a numeric vector of sampled values.
`sided`	sided is 'one' or 'two' depending on whether there is one or two specification limits. The default is 'one'.
`stype`	stype is 'known' or 'unknown' depending on whether the standard deviation is known. The default is 'unknown'.
`LSL`	LSL is the lower spoecification limit, leave it out if there is no lower specification limit.
`USL`	USL is the upper spoecification limit, leave it out if there is no upper specification limit.
`sigma`	sigma is the known standard deviation, leave it out if it is unknown an stype is 'unknown'.
`xbar`	sample mean. Leave it out if the vector sample is supplied.
`s`	sample standard deviation. Leave it out if the vector sample is supplied.
`n`	number of items in the sample. Leave it out if the vector sample is supplied.

Value

returns a single number (the estimated proportion nonconforming)

Author(s)

John S. Lawson <lawson@byu.edu>

Examples

```
EPn(sided="one",stype="known",LSL=100,sigma=8,xbar=110,n=10)
EPn(sided="one",stype="unknown",LSL=225,xbar=255,s=15,n=42)
sample<-c(197,188,184,205,201)
EPn(sample,sided="one",USL=209)
sample<-c(197,188,184,205,201)
EPn(sample,sided="two",LSL=180,USL=209)
EPn(sided="two",stype="known",sigma=2,LSL=90,USL=100,xbar=96.68,n=21)
```

MPn	*This function calulates the maximum allowable proprtion non-conforming.*

Description

This function calulates the maximum allowable proprtion non-conforming with sigma unknown or known using the standardized distribution.

Usage

```
MPn(k,n,stype)
```

Arguments

k	k is the acceptance constant for the variables sampling plan.
stype	stype is 'known' or 'unknown' depending on whether the standard deviation is known. The default is 'unknown'.
n	n is number of items in the sample required by the variables sampling plan.

Value

returns a single number (the maximum allowable proportion nonconforming)

Author(s)

John S. Lawson <lawson@byu.edu>

References

Lawson, J. "An Introduction to Acceptance Sampling and SPC with R" pp 45=48.

Examples

```
MPn(k=1.6094,n=10,stype="known")
MPn(k=1.905285,n=42,stype="unknown")
```

OCASNZ4D	*This function creates a data frame containing three columns 1)proportion defective=pd, 2)OC=prob accept, and 3)ASN=average sample no.*

Description

This function takes the data frame=plan created by the AAZ14Double function and and a vector of proportion defectives=pd. It calculates OC and ASN values and creates a data frame.

Usage

```
OCASNZ4D(plan,pd)
```

Arguments

plan	plan is a data frame with two rows containing sample no's=n,acceptance no's=c, and rejection no's=r for first and second samples
pd	pd is a vector of values of the poprtion defective to b used in the OC ASN Curves

Value

returns a data frame containing three columns 1)proportion defective=pd, 2)OC=prob accept, and 3)ASN=average sample no.

Note

This function calls the function AAZ14Double to get the specifications and recall and print the plan.

Author(s)

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Examples

```
pland<-data.frame(n=c(125,125),c=c(3,8), r=c(7,9))
Pnc<-seq(0,.08,.005)
OCASND<-OCASNZ4D(pland,Pnc)
OCASND$OC
OCASND$ASN
```

OCASNZ4M	*This function creates a data frame containing three columns 1)proportion defective=pd, 2)OC=prob accept, and 3)ASN=average sample no.*

Description

This function takes the data frame=plan created by the AAZ14Multiple function and and a vector of proportion defectives=pd. It calculates OC and ASN values and creates a data frame.

Usage

```
OCASNZ4M(plan,pd)
```

Arguments

plan   plan is a data frame with seven rows containing sample no's=n,acceptance no's=c, and rejection no's=r for first through seventh samples

pd   pd is a vector of values of the poprtion defective to b used in the OC ASN Curves

Value

returns a data frame containing three columns 1)proportion defective=pd, 2)OC=prob accept, and 3)ASN=average sample no.

Note

This function calls the function AAZ14Double to get the specifications and recall and print the plan.

Author(s)

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Examples

```
planm<-data.frame(n=c(50,50,50,50,50,50,50),c=c(0,1,3,5,7,10,13),r=c(4,6,8,10,11,12,14))
Pnc<-seq(0,.08,.005)
OCASNM<-OCASNZ4M(planm,Pnc)
OCASNM$OC
OCASNM$ASN
```

OCASNZ4S	*This function creates a data frame containing three columns 1)pro-portion defective=pd, 2)OC=prob accept, and 3)ASN=average sample no.*

Description

This function takes the data frame=plan created by the AAZ14Single function and and a vector of proportion defectives=pd. It calculates OC and ASN values and creates a data frame.

Usage

```
OCASNZ4S(plan,pd)
```

Arguments

plan   plan is a data frame with two rows containing sample no's=n,acceptance no's=c, and rejection no's=r for first and second samples

pd   pd is a vector of values of the poprtion defective to b used in the OC ASN Curves

Value

returns a data frame containing three columns 1)proportion defective=pd, 2)OC=prob accept, and 3)ASN=average sample no.

Note

This function calls the function AAZ14Double to get the specifications and recall and print the plan.

Author(s)

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Examples

```
plans<-data.frame(n=c(200),c=c(7),r=c(8))
Pnc<-seq(0,.08,.005)
OCASNS<-OCASNZ4S(plans,Pnc)
OCASNS$OC
OCASNS$ASN
```

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