



**NORBAR RUNDOWN FIXTURES
AND NOSE ASSEMBLIES FOR
ETS, DTS AND ETTA**

OPERATORS HANDBOOK (PART NO. 34134)

ISSUE 11

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THIS OPERATORS HANDBOOK COVERS THE FOLLOWING RUNDOWN FIXTURE MODEL NUMBERS

<u>MODEL NO.</u>	<u>DESCRIPTION</u>	<u>SQ. DR. SIZE</u>
50312	0.2 - 2 N.m (2 - 20 lbf.ins)	1/4"
50130	2 - 12 N.m (20 - 100 lbf.ins)	1/4"
50131	5 - 70 N.m (50 - 500 lbf.in)	3/8"
50132	10 - 140 N.m (10 - 100 lbf.ft)	1/2"
50133	100 - 700 N.m (100 - 500 lbf.ft) with bed	3/4"
51044	100 - 700 N.m (100 - 500 lbf.ft) without bed	3/4"

The above Rundown Fixtures include bench stands.

<u>MODEL NO.</u>	<u>DESCRIPTION</u>	<u>SQ. DR. SIZE</u>
50313	0.2 - 2 N.m (1.8 - 20 lbf.ins)	1/4"
50251	2 - 12 N.m (20 - 100 lbf.ins)	1/4"
50252	5 - 70 N.m (5 - 50 lbf.ft)	3/8"
50253	10 - 140 N.m (10 - 100 lbf.ft)	1/2"
50254	100 - 700 N.m (100 - 500 lbf.ft)	3/4"

The above Rundown Fixtures do not include bench stands.

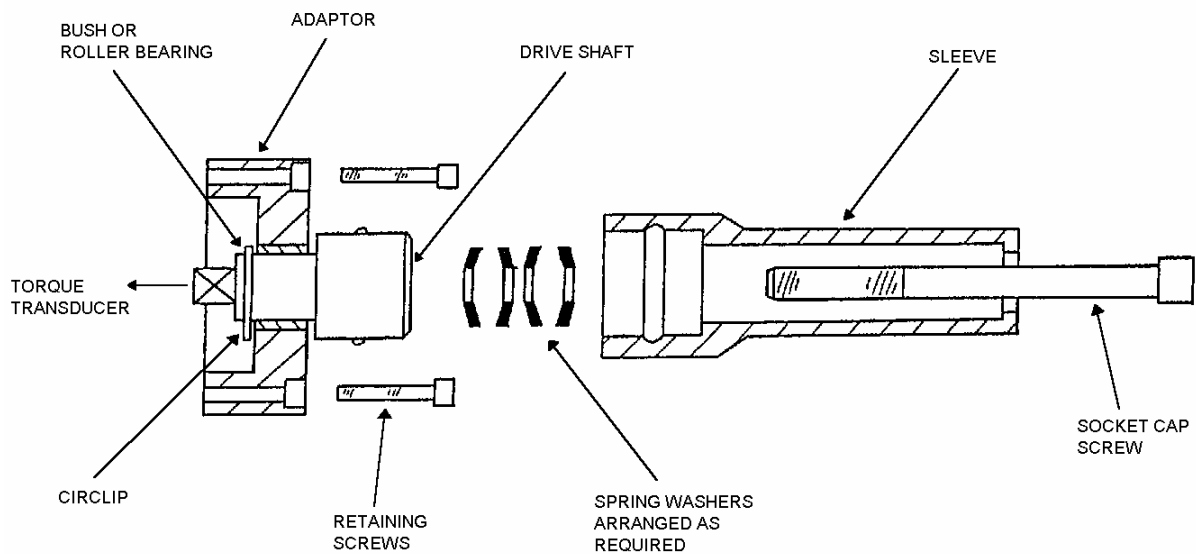
INTRODUCTION

The Norbar rundown fixture in conjunction with the Norbar Torque Transducer and ETS/DTS or ETTA is designed to measure the torque output of power torque tools. This it does by simulating the working conditions of screwed or bolted joints.

Spring Washers can be arranged in various serial/parallel combinations to represent the working conditions as seen by the tool, ie. joints of varying stiffness ('soft' or 'hard' pull up) and for a range of maximum torque outputs.

Refer to BS 6268-1982, ISO 6544-1981 and ISO 5393-1981 for further details on torque tool rundown.

EXPLODED VIEW OF FIXTURE ASSEMBLY

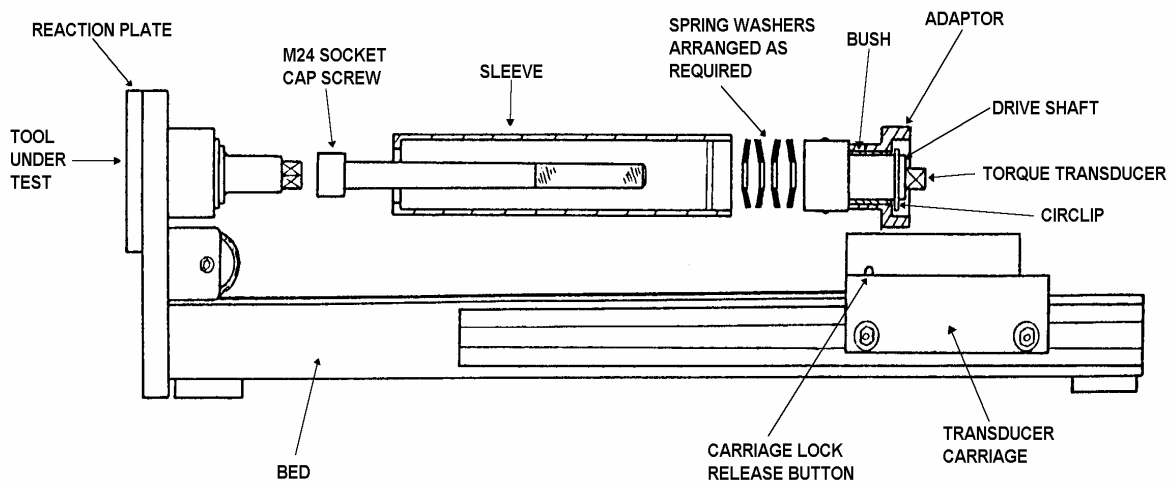


RUNDOWN FIXTURE BED FOR 50133, 100-700 N.M FIXTURE

When testing tools which require a reaction point, the rundown nose assembly must be used in conjunction with the rundown fixture bed which allows the transducer to move along the bed towards the reaction point as torque is applied.

The bed is necessary because as torque is applied, the length of the washer stack decreases thus the tool requires to move towards the transducer. Because the tools reaction point must be static due to friction, the transducer is mounted on a carriage which moves along grooves on the bed towards the tool as torque is applied.

EXPLODED VIEW OF FIXTURE ASSEMBLY



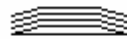
MODEL NO. 50312, 50313

0.2 N.m - 2 N.m

Washer arrangements for joint simulation



WASHERS IN
SERIES

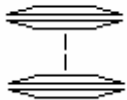


WASHERS IN
PARALLEL

WASHER MAKE UP FOR SOFT PULL UP CONDITION

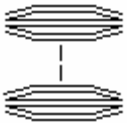
WASHER MAKE UP

TORQUE RANGE



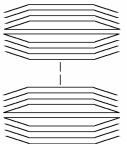
72 WASHERS
IN SERIES (STACK A)

0.2 - 0.7 N.m
(1.8 - 6 Lbf.ins)



40 STACKS OF 2 WASHERS
IN PARALLEL, IN SERIES (STACK B)

0.5 - 1.4 N.m
(4.5 - 12.5 lbf.ins)



20 STACKS OF 4 WASHERS IN
PARALLEL, IN SERIES (STACK C)

1.2 - 2.8 N.m
(10 - 25 lbf.ins)

Note: *Exceeding maximum torque for washer make-up will result in permanent damage to washers.*

Keep bolt and washers greased with a graphite loaded grease.

50312 and 50313 are supplied with washer stacks 'C'. Other stacks can be made up by rearranging stack 'C'.

For a 'hard' pull up condition, remove sleeve, long bolt and all spring washers and run down a short bolt and plain washer.

OPERATION PROCEDURE

Switch ETS/DTS or ETTA to 'memory' or 'memory auto reset' mode, and select filter 'ON' or 'OFF' as required (see instrument operators handbook for details).

With selected arrangement of belleville washers in fixture, run bolt down with tool and note torque output. Reverse tool to undo bolt ready for next test. Reset readout on ETS/DTS or ETTA if in 'memory' mode.

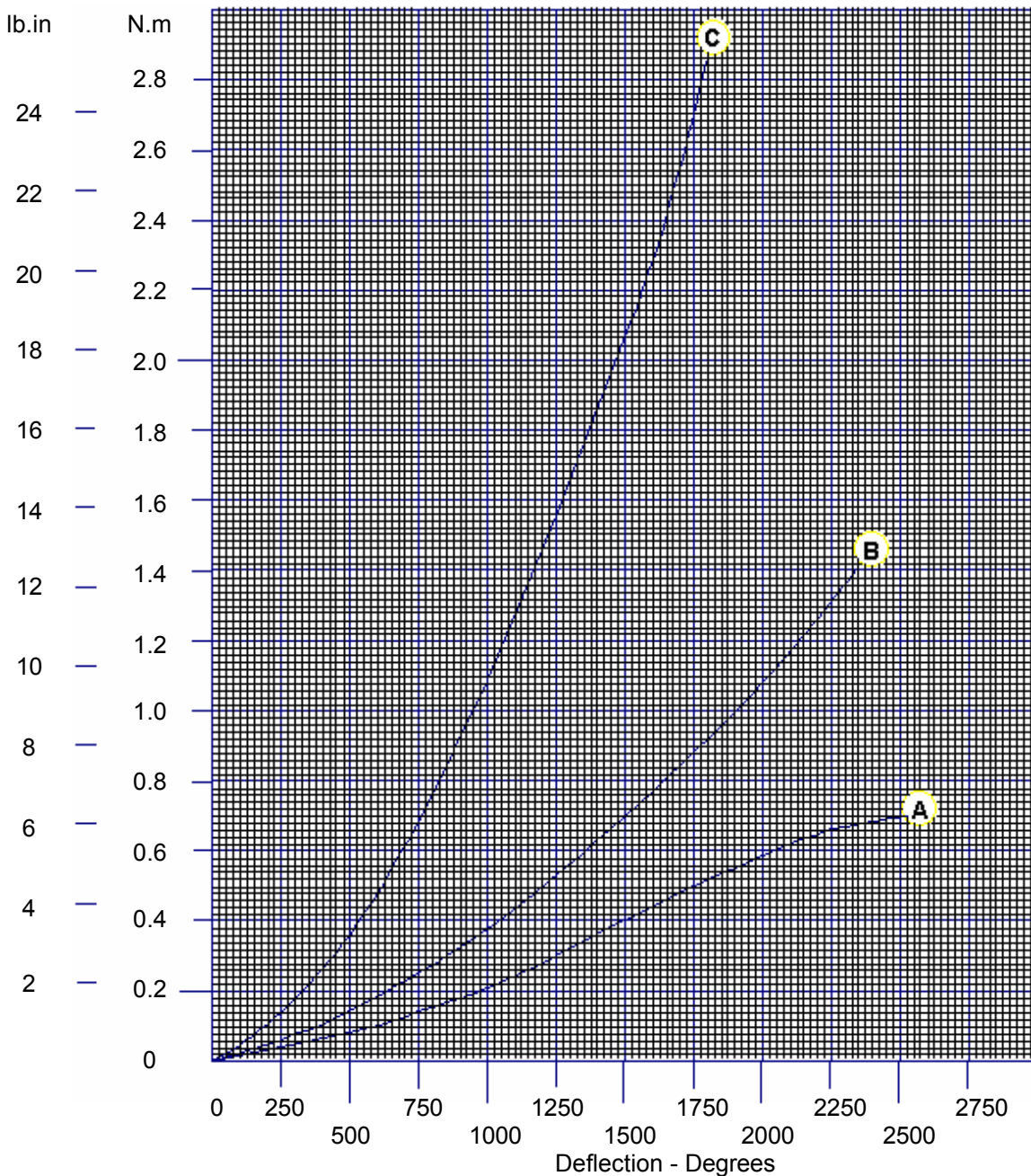
0.2 - 2 N.m, 2 - 20 lbf.ins Model 50312, 50313

GRAPH SHOWING TORQUE RATE CURVES FOR VARIOUS WASHER MAKE-UPS _____

BOLT SIZE: M6 x 80mm x 1.0 pitch, 12.9 socket cap screw, 5mm A/F

WASHERS: DIN 2093 - A12.5 (12.5mm x 6.2mm x 0.7mm)

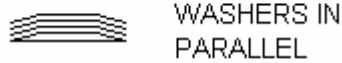
LUBRICATION: Rocol M204 G Graphite grease or Rocol Tufgear 85.



MODEL NO. 50130, 50251

2 - 12 N.m

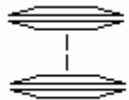
Washer arrangements for joint simulation



WASHER MAKE UP FOR SOFT PULL UP CONDITION

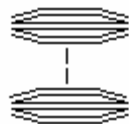
WASHER MAKE UP

TORQUE RANGE



40 WASHERS
 IN SERIES (STACK D)

2 - 6 N.m
 (20 - 50 Lbf.ins)



21 STACKS OF 2 WASHERS
 IN PARALLEL, IN SERIES (STACK E)

6 - 12 N.m
 (50 - 100 Lbf.ins)

Note: *Exceeding maximum torque for washer make-up will result in permanent damage to washers.*

Keep bolt and washers greased with a graphite loaded grease.

50130, and 50251 are supplied with washer stack 'E'. Other stacks can be made up by rearranging stack 'E'.

For a 'hard' pull up condition, remove sleeve, long bolt and all spring washers and run down a short bolt and plain washer.

OPERATION PROCEDURE

Switch ETS/DTS or ETТА to 'memory' or 'memory auto reset' mode and select filter 'ON' or 'OFF' as required (see instrument operators handbook for details).

With selected arrangement of belleville washers in fixture, run bolt down with tool and note torque output. Reverse tool to undo bolt ready for next test. Reset readout on ETS/DTS or ETТА if in 'memory' mode.

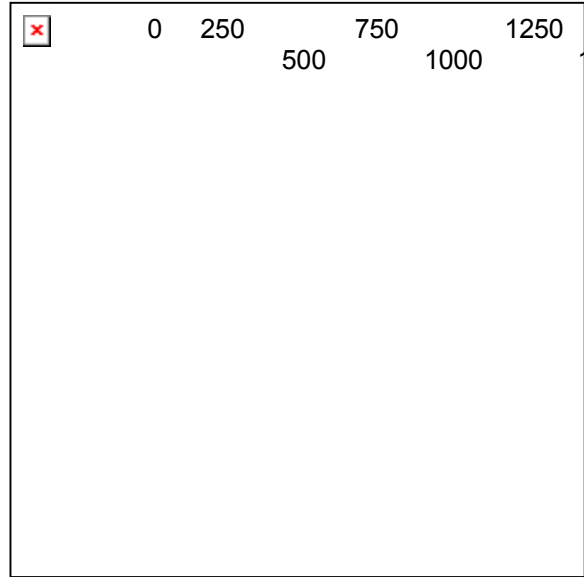
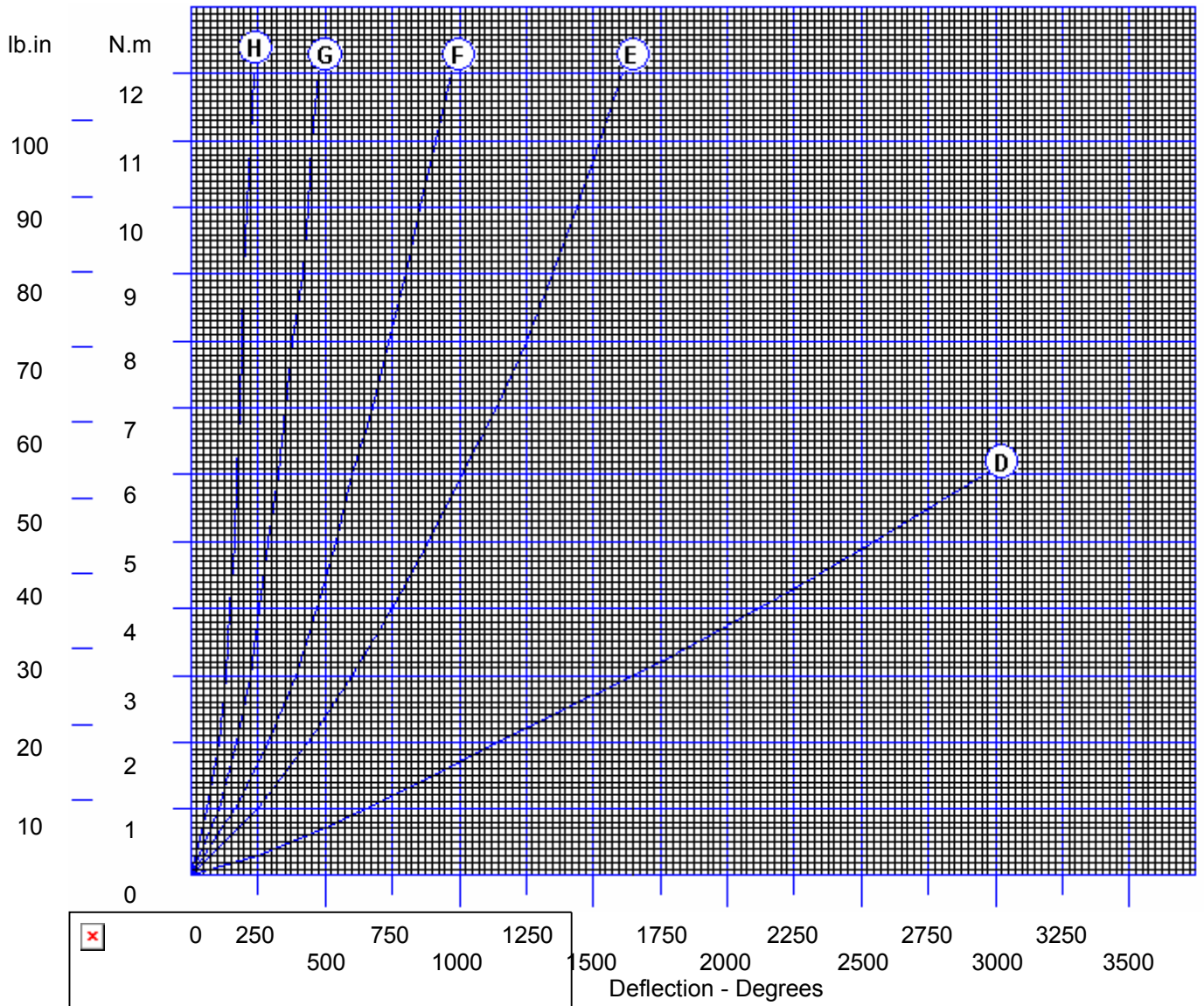
2 - 12 N.m, 20 - 100 lbf.in, MODEL 50130, 50251

GRAPH SHOWING TORQUE RATE CURVES FOR VARIOUS WASHER MAKE-UPS _____

BOLT SIZE: M6 x 1.00 Pitch, 12.9 socket cap screw

WASHERS: DIN 6796-6-FST (14mm x 6.4mm x 1.5mm)

LUBRICATION: Rocol M204 G Graphite Grease or Rocol Tufgear 85.



- 'D' 40 washers in series
- 'E' 21 stacks of 2 washers in parallel, in series
- 'F' 14 stacks of 3 washers in parallel, in series
- 'G' 7 stacks of 6 washers in parallel, in series
- 'H' 42 washers in parallel

NOTE: Washer make-ups 'D' and 'E' only for soft pull up condition.

'F', 'G' and 'H' for intermediate pull up condition.

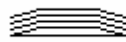
MODEL NO. 50131, 50252

5 - 70 N.m

Washer arrangements for joint simulation



WASHERS IN SERIES

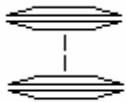


WASHERS IN PARALLEL

WASHER MAKE UP FOR SOFT PULL UP CONDITION

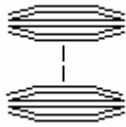
WASHER MAKE UP

TORQUE RANGE



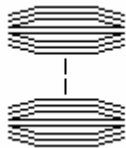
36 WASHERS IN SERIES (STACK A)

5 - 30 N.m
(5 - 20 Lbf.ft)



18 STACKS OF 2 WASHERS IN PARALLEL, IN SERIES (STACK B)

20 - 50 N.m
(15 - 35 Lbf.ft)



12 STACKS OF 3 WASHERS IN PARALLEL, IN SERIES (STACK C)

50 - 70 N.m
(35 - 50 Lbf.ft)

Note: *Exceeding maximum torque for washer make up will result in permanent damage to washers.*

Keep bolt and washers greased with a graphite loaded grease.

50131 and 50252 are supplied with washer stack 'C'. Other stacks can be made up by rearranging stack 'C'.

For a 'hard' pull up condition, remove sleeve, long bolt and all spring washers and run down a short bolt and plain washer.

OPERATION PROCEDURE

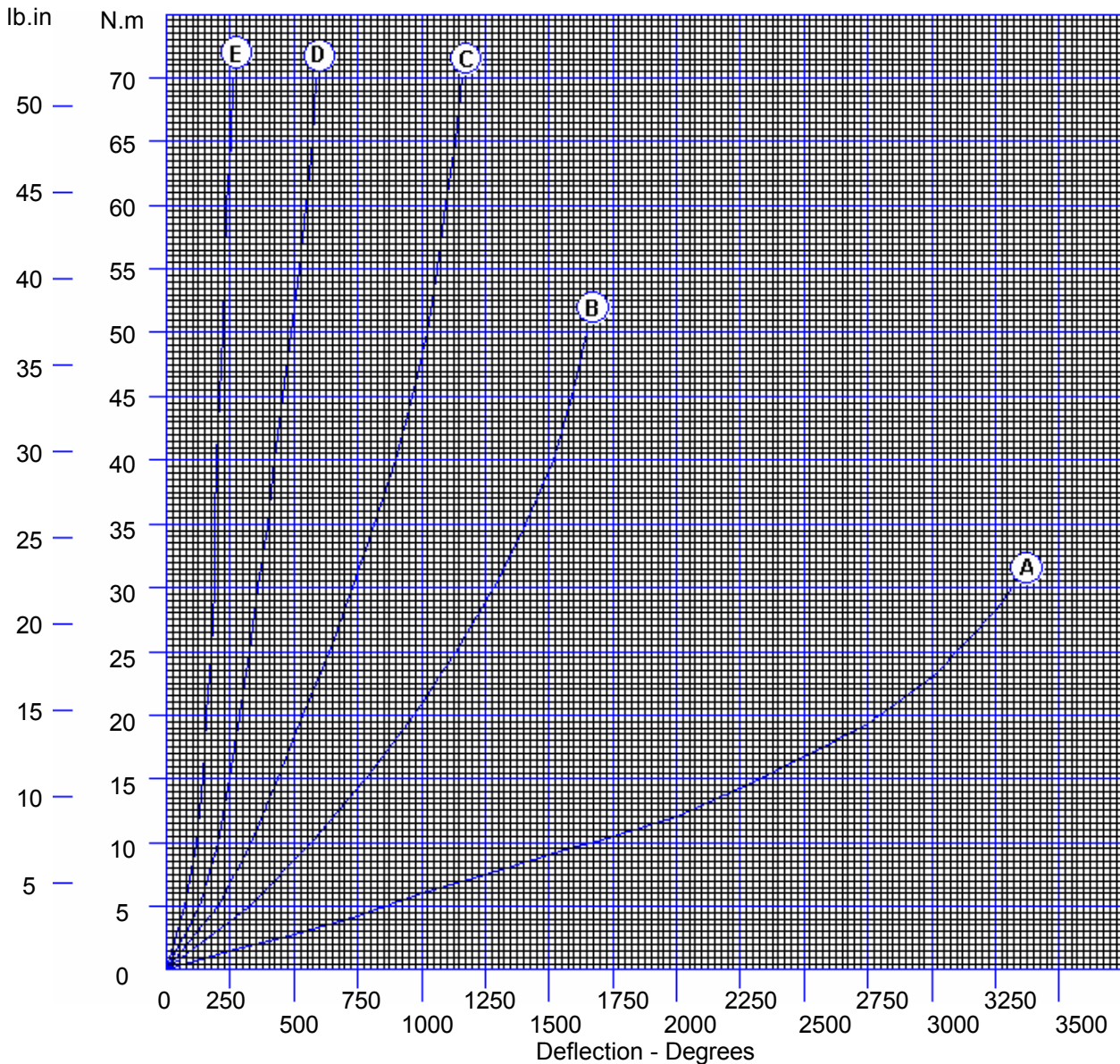
Switch ETS/DTS or ETТА to 'memory' or 'memory auto reset' and select filter 'ON' or 'OFF' as required (see instrument operators handbook for details).

With selected arrangement of belleville washers in fixture, run bolt down with tool and note torque output. Reverse tool to undo bolt ready for next test. Reset readout on ETS/DTS or ETТА if in 'memory' mode.

5 - 70 N.m, 50 - 500 lbf.in MODEL 50131, 50252

GRAPH SHOWING TORQUE RATE CURVES FOR VARIOUS WASHER MAKE-UPS _____

BOLT SIZE: M10 x 1.25 pitch, 12.9 socket cap screw.
 WASHERS: DIN 6796-10-FST (23mm x 10.5mm x 2.5mm)
 LUBRICATION: Rocol M204 G Graphite grease or Rocol Tufgear 85.



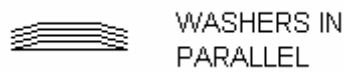
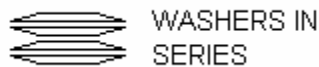
- 'A' 36 washers in series
- 'B' 18 stacks of 2 washers in parallel, in series
- 'C' 12 stacks of 3 washers in parallel, in series
- 'D' 6 stacks of 6 washers in parallel, in series
- 'E' 36 washers in parallel

NOTE: Washer make-ups 'A', 'B' and 'C' only for soft pull up condition. 'D', 'E' for intermediate pull up condition.

MODEL NO. 50132, 50253

10 - 140 N.m

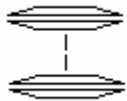
Washer arrangements for joint simulation



WASHER MAKE UP FOR SOFT PULL UP CONDITION

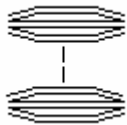
WASHER MAKE UP

TORQUE RANGE



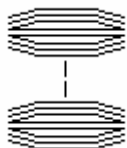
28 WASHERS
 IN SERIES (STACK F)

10 - 50 N.m
 (10 - 35 Lbf.ft)



15 STACKS OF 2 WASHERS
 IN PARALLEL, IN SERIES (STACK G)

30 - 100 N.m
 (25 - 70 Lbf.ft)



10 STACKS OF 3 WASHERS
 IN PARALLEL, IN SERIES (STACK H)

80 - 140 N.m
 (60 - 100 Lbf.ft)

Note: *Exceeding maximum torque for washer make up will result in permanent damage to washers.*

Keep bolt and washers greased with a graphite loaded grease.

50132 and 50253 are supplied with washer stack 'H'. Other stacks can be made up by rearranging stack 'H'.

For a 'hard' pull up condition, remove sleeve, long bolt and all spring washers and run down a short bolt and plain washer.

OPERATION PROCEDURE

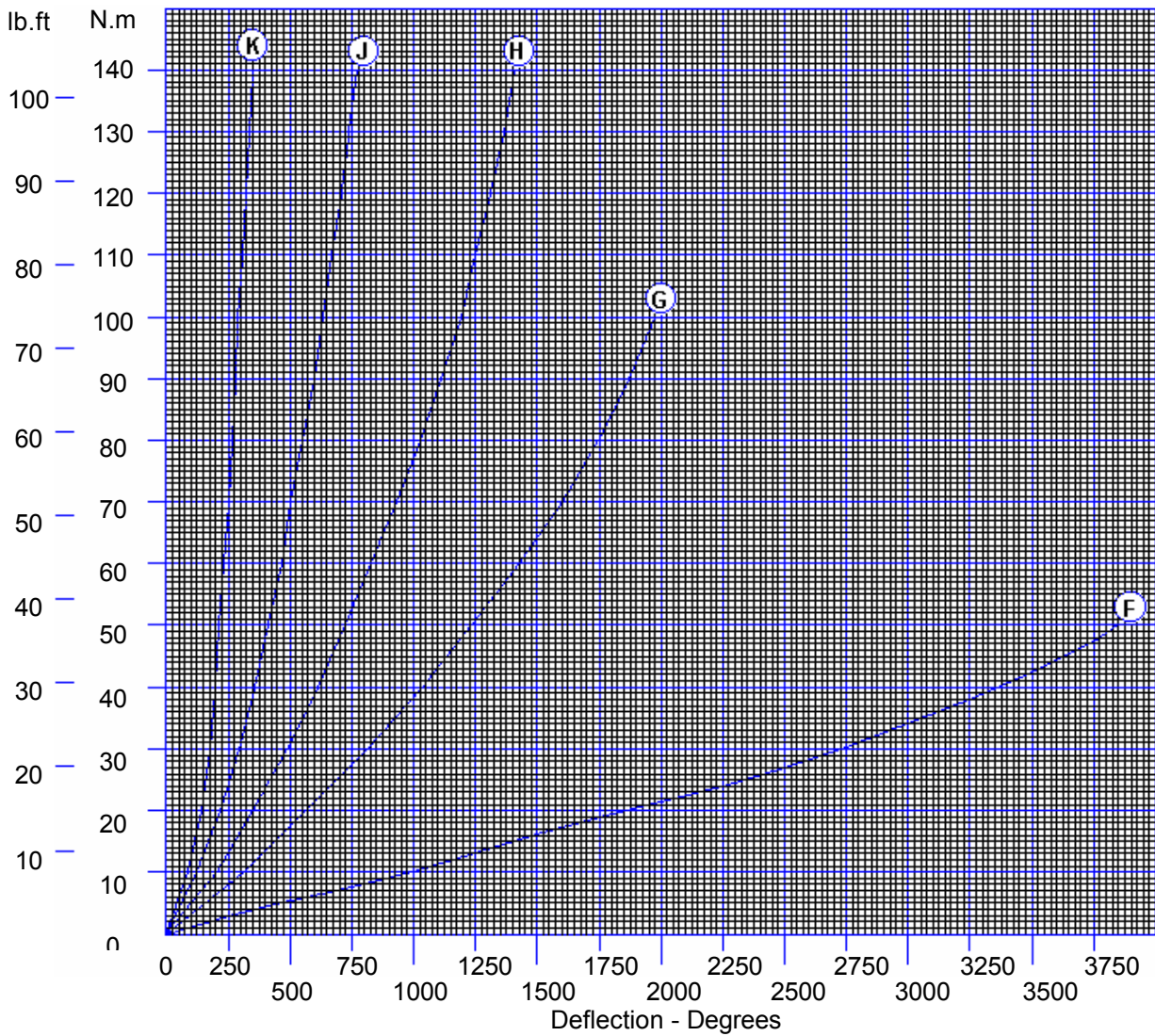
Switch ETS/DTS or ETТА to 'memory' or 'memory auto reset' mode and select filter 'ON' or 'OFF' as required (see instrument operators handbook for details).

With selected arrangement of belleville washers in fixture, run bolt down with tool and note torque output. Reverse tool to undo bolt ready for next test. Reset readout on ETS/DTS or ETТА if in 'memory' mode.

10 - 140 N.m, 10 - 100 lbf.ft Model 50132, 50253

GRAPH SHOWING TORQUE RATE CURVES FOR VARIOUS WASHER MAKE-UPS _____

BOLT SIZE: M12 x 1.25 pitch, 12.9 socket cap screw.
 WASHERS: DIN 6786-12-FST (29mm x 13mm x 3mm)
 LUBRICATION: Rocol M204 G Graphite grease or Rocol Tufgear 85.



- 'F' 28 washers in series
- 'G' 15 stacks of 2 washers in parallel, in series
- 'H' 10 stacks of 3 washers in parallel, in series
- 'J' 6 stacks of 5 washers in parallel, in series
- 'K' 30 washers in parallel

NOTE: Washer make-ups 'F', 'G' and 'H' only for soft pull up condition.
 'J' and 'K' for intermediate pull up condition.

MODEL NO. 50133, 50254, 51044

100 - 700 N.m

Washer arrangements for joint simulation



WASHERS IN
 SERIES

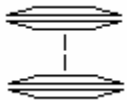


WASHERS IN
 PARALLEL

WASHER MAKE UP FOR SOFT PULL UP CONDITION

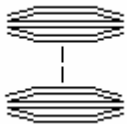
WASHER MAKE UP

TORQUE RANGE



30 WASHERS
 IN SERIES (STACK A)

100 - 400 N.m
 (100 - 300 Lbf.ft)



15 STACKS OF 2 WASHERS
 IN PARALLEL, IN SERIES (STACK B)

350 - 700 N.m
 (250 - 500 Lbf.ft)

Note: *Exceeding maximum torque for washer make-up will result in permanent damage to washers.*

Keep bolt and washers greased with a graphite loaded grease.

50133, 50254 and 51044 are supplied with washer stack 'B'. Other stacks can be made up by rearranging stack 'B'.

For a 'hard' pull up condition, remove sleeve, long bolt and all spring washers and run down a short bolt and plain washer.

OPERATION PROCEDURE

Switch ETS/DTS or ETTA to 'memory' or 'memory auto reset' mode and select filter 'ON' or 'OFF' as required (see instrument operators handbook for details).

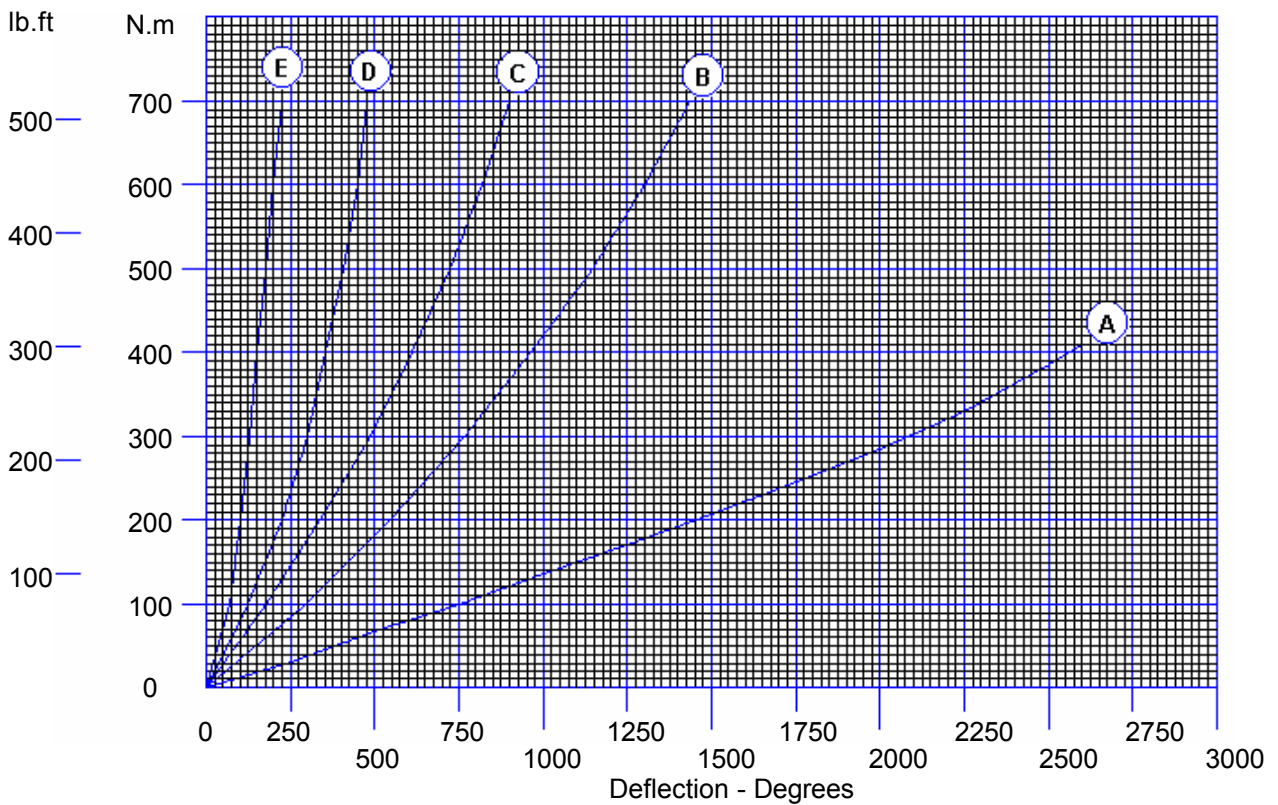
With selected arrangement of belleville washers in fixture, run bolt down with tool and note torque output. Reverse tool to undo bolt ready for next test. Reset readout on ETS/DTS or ETTA if in 'memory' mode.

100 - 700 N.m, 100 - 500 lbf.ft, Model 50133, 50254, 51044

BOLT SIZE: M24 x 240mm long x 3mm pitch, 12.9 socket cap screw, 19mm A/F.

WASHERS: DIN 6796-24-FST (56mm x 25mm x 6mm).

LUBRICATION: Rocol M204 G Graphite grease or Rocol Tufgear 85.



- 'A' 30 washers in series
- 'B' 15 stacks of 2 washers in parallel, in series
- 'C' 10 stacks of 3 washers in parallel, in series
- 'D' 6 stacks of 5 washers in parallel, in series
- 'E' 30 washers in parallel

NOTE: Washer make-ups 'A' and 'B' only for soft pull-up condition. 'C', 'D' and 'E' for intermediate pull-up condition.

BOLT AND HEX DRIVE SIZES

PART NO.	BOLT SIZE	HEX DRIVE
50312, 50313	M6	5mm AF
50130, 50251	M6	5mm AF
50131, 50252	M10	8mm AF
50132, 50253	M12	10mm AF
50133, 50254, 51044	M24	19mm AF

SPARE WASHER STACKS

PART NO.	CAPACITY	FOR USE WITH RUNDOWN FIXTURE
50175 (Washer Stack A)	0.2 - 0.7 N.m	50312/50313
50176 (Washer Stack B)	0.5 - 1.4 N.m	50312/50313
50177 (Washer Stack C)	1.2 - 2.8 N.m	50312/50313
50178 (Washer Stack D)	2 - 6 N.m	50130/50251
50179 (Washer Stack E)	6 - 12 N.m	50130/50251
50180 (Washer Stack F)	10 - 50 N.m	50132/50253
50192 (Washer Stack G)	30 - 100 N.m	50132/50253