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Reel diameter for various reel spool and roll core sizes

Scope

Nomographs to specify the on-machine jumbo reel diameter required to produce 1 to 5 sets of a given wound roll diameter, taking into account the spool and core diameters being used.

Safety precautions

Does not apply.

Content

The formula used for this calculation is:

$$\text{Reel Diameter} = [N \times (D^2 - d^2) + S^2]^{0.5}$$

where

N = Number of sets per jumbo roll
 D = Desired set diameter off winder
 d = Core outside diameter
 S = Reel spool outside diameter

The result can be obtained directly with the aid of a calculator or by using the nomographs attached.

Example:

Given a desired rewind roll diameter of 115 cm, the question is how large must the jumbo reel diameter be if we want four (4) sets to be made using 23 cm cores and a 91 cm reel spool.

Calculation Method:

$$\begin{aligned}\text{Reel Diameter} &= [4 \times (115^2 - 23^2) + 91^2]^{0.5} \\ &= 243.03 \text{ cm}\end{aligned}$$

Nomograph Method

- Step 1: Find the desired rewind roll diameter on the vertical axis ($D = 115$ cm)
Step 2: Proceed horizontally to the core diameter that will be used ($d = 23$ cm)
Step 3: Proceed vertically to the number of sets that will be made ($N = 4$ sets)
Step 4: Proceed horizontally to the spool diameter that is to be used.
Step 5: Drop vertically to read the required jumbo roll diameter on the bottom horizontal axis (Reel Diameter = 243 cm)

Helpful hint: It is impossible to physically measure the diameter of the reel. However, operators can determine when the reel diameter is of sufficient size per the preceding formula by measuring the radial distance from the outside diameter of the reel spool to the outside diameter of the jumbo roll and comparing this result to the results of the following equation:

$$\text{Reel Measurement} = (\text{Reel Diameter} - \text{Spool Diameter}) \div 2$$

Based upon the previous example, this radial reel measurement would be:

$$(243 \text{ cm} - 91 \text{ cm}) \div 2 \text{ or } 76 \text{ cm}$$

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Additional information

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